Kurdish Studies
Feb 2024
Volume: 12, No: 2, pp.2060-2066
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Received: December 2023 Accepted: January 2024
DOI: https://doi.org/10.58262/ks.v12i2.148

Digital Competencies for Vocational Teachers in 21st Century Learning

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Abstract

The aim of the literature review study is to obtain information regarding the condition of digital competence possessed by students and teachers in the era of the industrial revolution 4.0. The determining factor for the industrial revolution 4.0 is digital competence. In this era, the quality of global education has not been able to meet the needs of digital education. The education system shapes students' thinking to compete with each other. Digital competency exists as a form of digital technology development in society. Digital technology grows and develops along with the times. In this research, researchers used the library observation method. The way to obtain data using this method is by conducting library observations on previous articles and research. The articles or research used as data sources come from journals published in the last 10 years. Based on the research results, it was found that teachers and students have low digital competence so that their mastery of digital technology is also low. It was also found that the level of awareness of teachers and students regarding digital technology awareness was very low, digital literacy and digital technology skills were low. Based on the results of this literature, it is necessary to follow up on how students and teachers have digital competence for the future in accordance with needs.

Keywords: *Digitalization, Technology, Teacher*

Introduction

The Industrial Revolution 4.0 affects the development of digital science and technology. The existence of digital forms of digitalization is able to penetrate all sectors of this life. Digital competencies are still widely debated (Vilppoda et al., 2018). Thus, due to the rapid demand and implementation of technology, many people want to take full advantage of digitalization. It is utilized to improve the education system. If utilized or implemented in schools, it can improve human resources in the school, both for teachers, students and the school academic community. The impact is that the school will also feel the convenience due to digitalization (Antonio et al, 2019).

The reality of global education does not accommodate the needs of digital education. Globally, the paradigm formed in the learning process is how students can be the best in the sense that students are asked to compete. Educators do not teach students to work together, but educators only teach students to compete. (Tielman et al., 2022). For example, the ranking system in the classroom or accelerated class program causes competition between students. This pattern will cause students to think competitively and schools only educate students in the cognitive domain.

This forgetting the culture of cooperation and collaboration (Astuti et al, 2021). This

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contradicts the description of the 21st century that individuals live in an environment full of technology use, where there is easy access to abundant information, new patterns of communication and collaboration. To support success in the digital era, it is necessary to have a skill base in the digital era, including critical thinking, problem solving, communication, and collaboration skills (Prayogi &; Rio, 2019).

In the digital era, the workforce is required to have technological capabilities. This ability is useful for competition in the world of work and in the business world. In addition, having the ability in the field of technology will meet the competencies needed in this era. Based on this, digital competence is very important to develop human resources in the era of the industrial revolution 4.0 (Teo et al., 2021).

Digital competence has a crucial role in solving everyday problems. Digital competence can solve problems, facilitate communication and access to information. In addition, digital competence can establish reciprocal relationships with other individuals. The use of digital technology in everyday life leads to efficiency and effectiveness of life. Individuals who have digital skills can shape individuals into critical, creative, autonomous, flexible, and ethical individuals. Besides being able to shape mindset and personality, technology can also be used as a means of entertainment, learning, training and empowerment. The progress and development of the digital world has a significant effect on the world of education. Digital technology is able to change learning methods, curricula and learning objectives from conventional learning to digital-based learning (Mateo et al., 2014). Meanwhile, according to Spante et al, (2018) the main focus area, namely digital competence, is able to be implemented in schools evenly. And it is also necessary to evaluate the extent to which the school is ready to apply it. Indirectly, teachers will work not only to develop their pedagogical competence but also to improve their digitalization competence.

Given the importance of digitalization, this research aims to support the achievement of a learning process that leads to digitalization, and also see how the role of teachers in digital competenc e. So as to be able to determine future improvements and also provide training as an effort to finalize their abilities.

Research Methodology

This research uses a literature review methodology of relevant article manuscripts with their attributes. The review was carried out in depth, examining texts that discussed digital competencies, especially for vocational schools. The results of the study are then analyzed and presented again in the form of a review in the form of an article. In this study, the author used the literature review method as a data collection technique. Information obtained collected through literature review can be in the form of previous articles or research that are considered valid and have reliable and up-to-date sources (journals of the last 10 years)

Literature Review

1. Technological Pedagogical Content Knowledge (TPACK)

Previous research has suggested that most prospective teachers do not have the ability to use technology. Prospective teachers have no preparation or training in technology. This causes prospective teachers to be unable to apply digital technology-based learning to the teaching and learning process (Foulger et al., 2017).

In the learning process, teachers are asked to design technology-based learning, but very few teachers apply technology-based learning systems in the classroom. In the field, it is very difficult to find prospective teachers who work side by side with teachers who are already professionals in using technology as a learning medium (Ovens &; Rot, 2018).

Based on the development of research in the field of education over the past 10 years, the field of education has used the conceptual framework of Pedagogical Content Knowledge Technology (TPACK). The goal is as a guide for teachers in the learning process to be more effective by using technology.

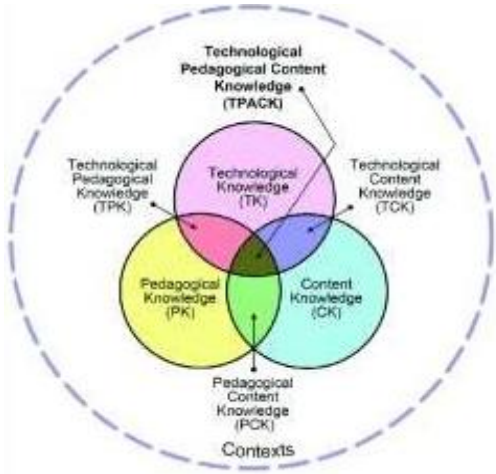

Figure 1: TPACK Framework (Source.: Rosenberg & Matthew, 2015).

TPACK or known as Technological Pedagogical Content Knowledge is a theory that is used as a guide for implementing technology into education. TPACK is a center for research and development of technology in the field of education so as to obtain teacher outcomes who are proficient in the field of technology. TPACK can be interpreted as an extension of various characteristics of knowledge needed in teaching certain material to students.

The TPACK framework (see Figure 1) encompasses many things, namely knowledge of technology, pedagogy and the form of management of the discipline or subject being taught to students (Ndongfack, 2015).

2. Digital Competence

DDigitalization in the field of education has emerged in recent years by becoming the main study of education policy. (Cattaneo et al., 2021). At the same time, a concept called digital competence also emerged. This concept gave changes to the field of education. These changes are considered very good for the development of education so that this concept continues to develop in the world of education (Burne, 2018). The development of digital concepts in the world of education causes research on this matter to be increasingly popular. In Europe, research on digital access and development has been conducted Blyznyuk, T. (2018). By using online platforms, digital proficiency and skills began to be applied in the world of work. Based on this, digital competency development should be seen as a continuation of productive teacher skill development (Soroka, 2020).

Gilster (1997) in Soeprijanto, et al (2021) is the first person to have put forward the term digital competence which he obtained from a trusted source. Digital competence includes aspects of

individual attitudes, interests, and skills in processing, interpreting and analyzing and evaluating new knowledge and trying to apply it (Winangun, 2017).

According to Khitrova (2021) information and communication technology (ICT) relates to the ability of others to be able to operate the use of electronic devices, communication tools properly. The existence of this ability can then be utilized in doing various things, research, and evaluation of information that can provide changes in learning and teachers are able to work effectively.

Literacy is one of the skills to understand the use of technological devices simply. By prioritizing literacy, skills can be improved, as technical-procedural, cognitive and socioemotional benefits that will increase along with the increase in literacy (Mon et al, 2020). According to Harmoko, et al (2021) in the era of digital development, learning must be prepared optimally by conducting training for teachers related to digital technology.

Research Results

Based on the research results from several reference sources, it was found that:

3. Comparison of Digital Competencies Owned by Teachers and Students is not Significantly Different

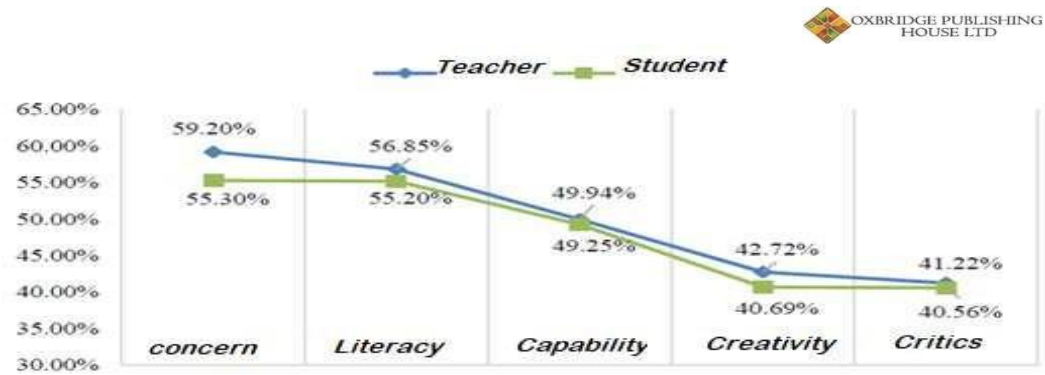

Figure 2: Graph of Digital Competence of Teachers and Students (Source: Astuti et al, 2021).

4. Relationship Between Teachers' Digital Competencies and Level of Professionalism

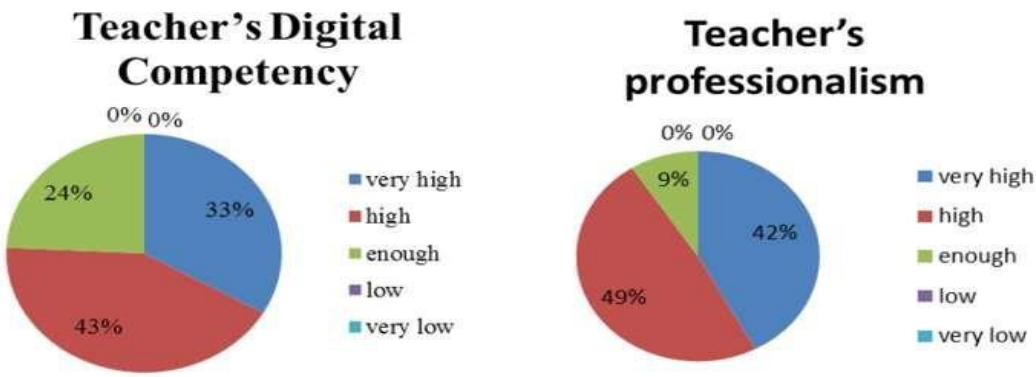

Figure 3: Comparison of Teachers' Digital Competencies and Professional Levels (Source: Mangiri, 2019).

Discussion

Based on the research results, it was found that:

1. Comparison of digital competencies owned by teachers and students is not significantly different. Based on the results of the research that has been conducted, it can be seen that there are still low.

a) Forms of sensitivity to the importance of technology owned by teachers and students. The score obtained by teachers is 59.20% (low) at the teacher maturity level, with an average of 23.65. While for students it is 55.30% with an average of 22.12.
b) At the literacy level, teachers get a score of 56.85% and the average obtained is 22.74%, while students get 55.20% with an average of 22.08.
c) On the technological ability skills possessed, teachers have a value of 49.95% and get an average value of 15.98, while the value obtained by students is 49.25% with an average of 15.76.
d) At the level of creativity owned by teachers, 42.72% with an average of 13.67, while students have a value of 40.69% with an average of 13.02.
e) At the critical thinking level the teacher has 41.22% and the average is 13.19, while students have 40.56% with an average of 12.98%.

2. The Relationship between Teachers' Digital Competencies and the Level of Teacher Professionalism

In the study, it was found that there is a relationship between teachers' digital competence and professionalism. Based on the results of the regression test, it is

known that the value of $\beta = 0.437$; t count = 2.500 and significant = 0.018. It can be concluded that there is a significant positive influence between teachers' digital competence and teacher professionalism. This means that a teacher who has digital competence will have a high level of professionalism.

Competence is able to focus on a person's ability to fulfill various roles in providing good impact and mobility of resources related to a particular context. For example, a person's ability to communicate efficiently can improve his language skills, IT and improve his attitude in communication. In recent decades, competencies have become an essential element in all stages of education, both formal and non-formal. In this regard, the current Spanish education law stipulates that the curriculum must include competencies and capacities for the integral application of appropriate content for each stage of teaching and education to ensure proper performance of activities and effective problem solving for teachers in education (Hidalgo et al., 2020).

The same statement was stated by Melinda, et al (2021), namely that every teacher who has good performance is able to use information technology. In addition, it was also found that teachers are a profession that must know a lot of information. Therefore, teachers must be able to identify all material distributed to students

Implications

Education offices and schools need to increase activities on teachers' digital competencies, so that they can help and improve teachers' professionalism, and there is also a need to conduct more in-depth research related to the determinants (internal and external) that will affect teachers' abilities.

Conclusion

1. Teachers and students have the same level of ability in the field of digital technology. Both teachers and students have matured at low levels of digital technology awareness, digital technology literacy and digital technology skills. Meanwhile, teachers and students mature in the very low category at the level of creativity of digital technology and critical of digital technology. Education should make this issue the focus of study. It aims to find a solution to this problem. This is because awareness of digital literacy is very important as a basis for mastering digital technology. As a means of increasing mastery of technology, it is required to conduct training and learning related to digital competence.
2. There is a positive relationship between professional competence and digital competence possessed by teachers (directly proportional).

Weaknesses/Deficiencies

This research has limitations, namely in the implementation of digital competencies in teachers. This limitation occurs due to the application system that is difficult to understand and the lack of public understanding about the use of digital technology, especially in the field of education.

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