



Measurement of the Level of Digital Competence of Vocational Teachers in Learning Development

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ABSTRACT

Online learning requires teachers to carry out distance learning by utilizing developing technology. In the future, teachers' ability to organize learning activities in cyberspace cannot be matched if they still use conventional methods. At this time, teachers who have digital competence become an unavoidable need. This research aims to measure the level of digital competence of vocational teachers in learning development. Teachers' digital competency levels are measured by national standards published by the Australian government through the Australian Qualification Framework (AQF). This research is planned to be carried out in four stages. In the first stage of the literature review, the second stage was validation of the instrument, the third stage was distributing the instrument to 70 respondents for DPIB teachers through an online survey, and in the fourth stage, data analysis and processing were carried out through descriptive statistical analysis. The research results show that the level of digital competence of teachers in learning development tends to be in the moderately capable category. The current conditions, with the rapid development of technology and the demands of a vocational teacher in digital competence, are required to be capable, even very capable, in developing digital learning.

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ARTICLE INFO

Article History:

Submitted/Received 19 Nov 2023

First Revised 29 Dec 2023

Accepted 04 Feb 2024

First Available online 06 Feb 2024

Publication Date 01 Mar 2024

Keyword:

Digital competence,

Learning development,

Vocational teacher.

1. INTRODUCTION

The COVID-19 pandemic has made many changes in various areas of human life, including education (Aswari, 2021; Zhao & Watterston, 2021). During the COVID-19 pandemic, learning was carried out online due to limited space between students, teachers, and the educational environment. There are no more learning activities in classrooms as is usually done by educators, both teachers and lecturers. Educational institutions are not ready or cannot deliver courses online. As a result, many stuttering educators face this drastic change (Crowe *et al.*, 2021). However, online learning is a useful alternative during the Covid-19 pandemic. This situation on the one hand is quite encouraging, considering that through online learning every educator can be creative and innovative in planning and compiling learning models (Reimers *et al.*, 2017) and improve digital skills and competencies. Online learning requires teachers to carry out distance learning by utilizing emerging technology (Liu *et al.*, 2020). Adaptation is needed during a pandemic, especially in online learning, namely with a better understanding of digital literacy.

In the future, teachers' ability to carry out learning activities in cyberspace cannot be balanced if they still use conventional methods. Teachers who have digital compatibility are an unavoidable need. Digital competence is more comprehensive when compared to just digital skills. Digital competencies include technical aspects related to hardware and software management, as well as cognitive abilities related to knowledge and education (Falloon, 2020; Allman & Blank, 2021). In the context of education, digital competence can be interpreted as the use of technology in a convincing, appropriate, and safe way to achieve learning and educational goals. According to Digcom 2.0, a scientific project developed by the Joint Research Center (JRC) of the European Commission, there are at least five digital competencies that can be pursued: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving (Alnasib, 2023; Chaka, 2020).

This situation is in line with the development of the Industrial Revolution 4.0 which was first echoed at the Hannover Fair in 2011. This term is used by the German government to advance the industrial field to the next level, with the help of technology. The Industrial Revolution 4.0 applies to education. With the abolition of the National Exam, studying at home through certain applications, online lectures, tutoring, and online seminars are examples of educational services that accelerate the application of education in the era of the Industrial Revolution 4.0. Teachers and students are encouraged to understand the use of digital technology. On the other hand, students are also forced to explore technology and information and channel their creativity through innovations in the tasks given.

In addition to the development of the Industrial Revolution 4.0, education in the 21st century requires teachers to master various skills (Lase, 2019). Teachers can facilitate and inspire the learning and creativity of students innovatively by using digital devices and resources. Teachers are also able to design and develop student learning experiences with assessments in the form of providing formative and summative evaluation tools that vary according to technology and content standards and integrate digital devices and sources (Zhorova *et al.*, 2022).

Following the purpose of the study, namely, to measure the level of digital competence of vocational teachers in learning development, the Australian Qualification Framework (AQF) as a reference for digital education competency standards for teachers is used to examine the extent of teachers' digital competency levels (Dwiyanti *et al.*, 2023). This is related to the rapid development of education and technological advances. This level of teacher digital

competence is measured through: how to evaluate, implement, and use ICT-based education platforms; how to use e-learning with social media; how to design pedagogy for e-learning; how to analyze, apply, and evaluate electronic assessments; how to implement better learning practices; how to initiate and lead applied research; how is the direct ICT procurement system; and how to review the implementation of e-learning systems and solutions in schools.

Digital transformation is the strategy of adopting digital technologies to improve, and efforts to change, business models (Bresciani *et al.*, 2021). Digitization, like collecting and migrating paper-based data to a digital platform, refers to true digital transformation, a process that leverages new technologies to deliver digital solutions that can truly reshape an organization's value proposition (Marion & Fixson, 2021). However, this process is often characterized as a journey for a reason. This transformation is not a one-time event, but an evolution. In this sense, digital transformation is a story about human leadership, culture, vision, capability, and management. That is why it, should, be examined through the lens of skills, capabilities, education and training, and national workforce development in Australia, including teachers and lecturers. The Australian government is focusing on developing a digital education model after the COVID-19 pandemic. The model development carried out by the Australian Government is shown in **Figure 1**. The application of national standards issued by the Australian Government through the Australia Qualification Framework (AQF) for Digital Education is contained in the TAE80316 Graduate Certificate in Digital Education. Digital education with AQF standards is more detailed sourced from www.training.gov.au.

Every teacher who will take certification on the TAE80316 Graduate Certificate in Digital Education. Required to take a unit package to be tested with 3 mandatory units including TAEDEL801 (Evaluate, implement, and use ICT-based educational platforms), TAEDEL802 (Use e-learning with social media), and TAELED801 (Design pedagogy for e-learning). In addition to the compulsory units that must be taken, teachers are required to take a package of elective units including Group A TAEASS801 (Analyze, implement and evaluate e-assessment) and TAELED803 (Implement improved learning practice, and Group B includes BSBRES801 (Initiate and lead applied research), ICTICT805 (Direct ICT procurement) and TAELED804 (Review of enterprise e-learning systems and solutions implementation).

2. METHOD

Considering the purpose of the study, which is to measure the level of digital competence of vocational teachers, the research approach used in this activity is quantitative methods. Meanwhile, analyzing the digital competence of teachers is carried out with a descriptive method. The descriptive method is a study conducted to determine the value of an independent variable, either one or more variables (independent) without making comparisons or connecting with other variables. It can be said that quantitative descriptive research methods are research that seeks to show the results of a quantitative or statistical data collection such as surveys as they are, without being calculated or seen concerning treatment or other variables.

The respondents were taken from as many as 70 teachers from a total of 280 vocational teachers in the field of expertise of DPIB in West Java, Indonesia. This research consists of four stages that can be seen in the flow diagram image of the research procedure (see **Figure 1**). In the first stage, a literature review was conducted to determine digital education competency indicators based on the Australian Qualification Framework for developing instruments. In the second stage, instrument validation is carried out with construct validity and content validity. The validity of the construct is calculated by product moment and

Cronbach Alpha reliability test, while the validity of the content is carried out through expert judgment. In the third phase, validated questionnaires will be distributed through an online survey to measure teachers' self-assessment of their digital competencies. In the fourth stage, analysis, and processing of data from survey results are processed through descriptive analysis. The results of this questionnaire are used to draft digital education competency standards.

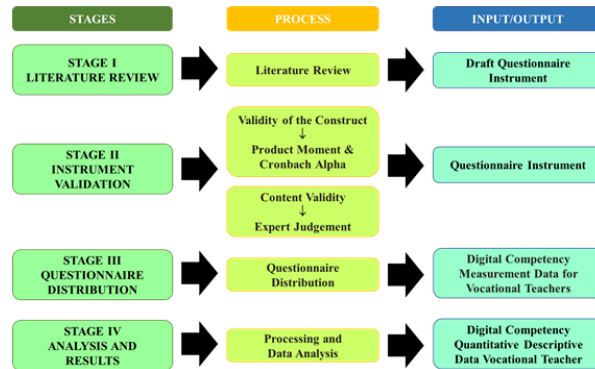


Figure 1. Stages of research.

3. RESULTS AND DISCUSSION

Distribution of instruments to 70 vocational teachers as respondents, and those who returned and filled in a total of 68 respondents. The results of the descriptive analysis by analyzing the tendency of respondents in filling out the instrument found that the digital competence of vocational teachers was in the category of quite capable to be very capable of being possessed by 55 teachers or around 80.88%. Thus, most vocational teachers in the field of expertise of DPIB have digital competencies that are capable of developing their learning (see Figure 2).

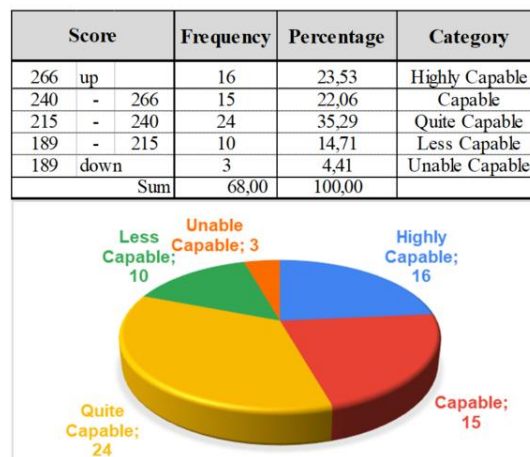


Figure 2. Digital competition trends of vocational teachers.

Analysis was also carried out on each indicator of digital competence of vocational teachers. The national standard published by the Australian Government through the Australia Qualification Framework (AQF) for Digital Education Indicator consists of 7 indicators. Trend analysis in Indicator 1 on evaluating, implementing, and using ICT-based education platforms. A total of 42 vocational teachers or around 61.76% have digital competence capable enough to be very capable in developing digital learning and are described in Figure 3. In Indicator 2 regarding the use of e-learning with social media (see

Figure 4), the results of the analysis of the tendency to have digital competencies that are quite capable to very capable were obtained by as many as 62 teachers or around 91.17%. These results show that respondents have digital competence in the use of social media that is familiar through handphones or other devices.

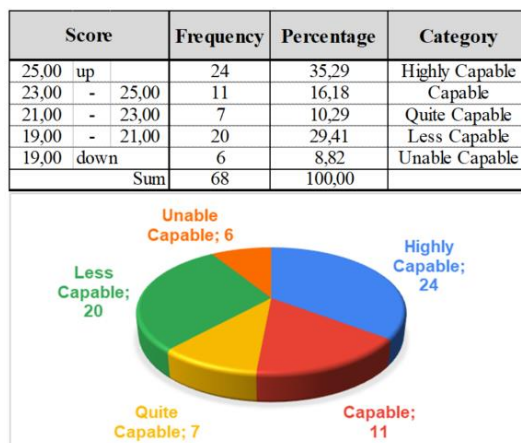


Figure 3. Digital competency trends of vocational teachers' indicator 1.

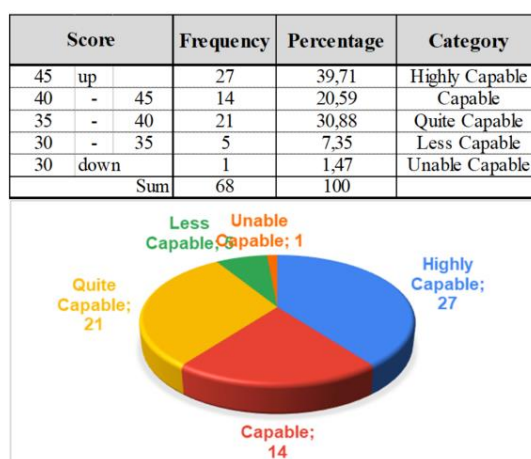


Figure 4. Digital competency trends of vocational teachers' indicator 2.

Indicator 3 on pedagogical design for e-learning (see Figure 5), obtained a tendency where teachers as many as 54 vocational teachers in the field of expertise of DPIB have digital competencies in the category of moderately capable to very capable. Analysis of trends in Indicator 4 is analyzing, implementing, and evaluating grading systems (see Figure 6). In this indicator, a total of 63 teachers or around 92.64% have sufficient to very sufficient digital competence in developing their digital learning. So only 7.36% of teachers in the field of DPIB expertise are less able to develop their digital competencies.

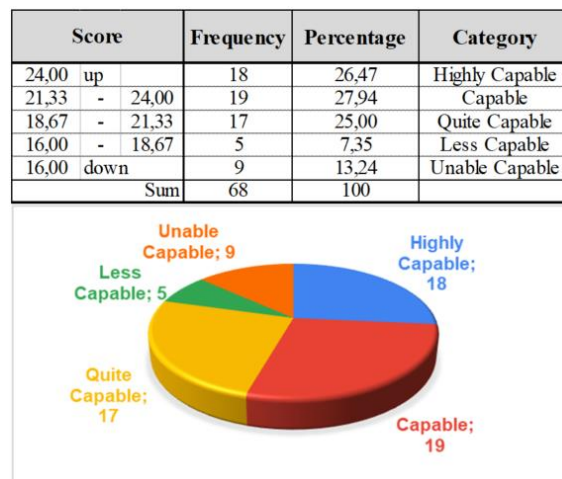


Figure 5. Digital competency trends of vocational teachers' indicator 3.

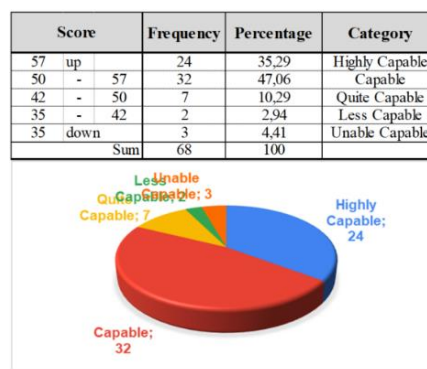


Figure 6. Digital competency trends of vocational teachers' indicator 4.

The implementation of better learning with ICT is the 5th indicator in the Australian Qualification Framework (AQF) (see **Figure 7**). The results of the tendency analysis were obtained from as many as 65 teachers, or around 95.58% of teachers have competence that is quite capable to very capable. This indicates that with digitalization in learning, teachers can apply their learning even better. Trend analysis in Indicator 6 about carrying out classroom action research (see **Figure 8**). The results of the trend analysis were obtained by a total of 55 people or around 80.88% of vocational teachers in the field of expertise of DPIB have digital competencies in the category of quite capable to very capable in the development of digital learning. Some teachers do not have the competence in the implementation of classroom action research.

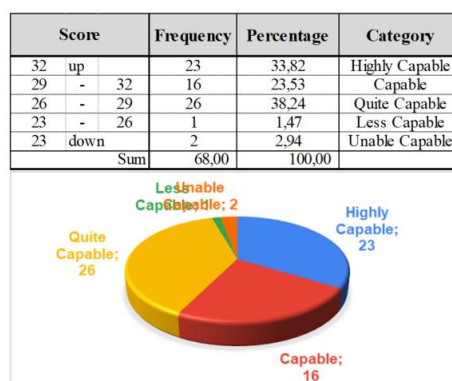


Figure 7. Digital competency trends of vocational teachers' indicator 7.

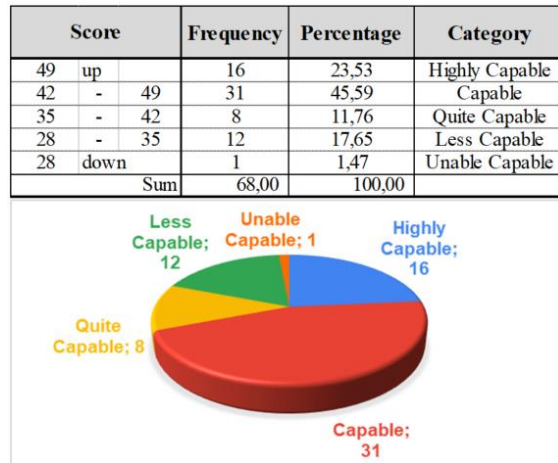


Figure 8. Digital competency trends of vocational teachers' indicator 6.

In Indicator 7 on reviewing the implementation of e-learning learning systems and solutions (see Figure 9), from the results of the analysis, there was a tendency that 59 teachers or around 86.76% of vocational teachers in the field of expertise of DPIB have digital competencies in the moderately capable to very capable category. There are 13 teachers or around 13.24% who do not have digital skills in the development of digital learning.

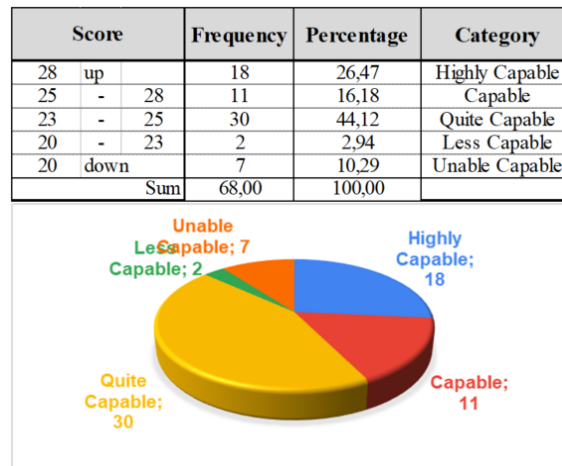


Figure 9. Digital competency trends of vocational teachers' indicator 7.

4. CONCLUSION

The digital competence of vocational teachers in the field of expertise of DPIB in learning development from trend analysis both as a whole and seen for each indicator has a category from moderately capable to very capable. Indicators that show high ability for vocational teachers' digital competence are found in indicators of better learning implementation using ICT. Meanwhile, the indicators that still have sufficient competency capabilities are found in the indicators of evaluating, implementing, and using ICT-based education platforms. Most vocational teachers in the field of expertise of DPIB have qualified digital competency capabilities in the development of ICT-based learning.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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