

## The Effectiveness of ICT-Related Training in Increasing the Competence of Vocational School Teachers

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### ABSTRACT

Vocational schools are specifically designed to produce graduates ready for the job market and industry. In vocational schools, teachers have an important position. Therefore, competency development is a must related to ICT. This study describes the effectiveness of ICT competency development training and its correlation to vocational teachers' competence. The research method is carried out by reviewing relevant previous studies and then drawing a result and conclusion. There are two main results of this research. First, ICT-related training has a positive influence on the competence of teachers as participants. Second, the positive impact of training is only felt on a small scale, so teacher competence on a large scale (Indonesia) still needs to be improved.

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## 1. INTRODUCTION

Education is an essential component for the development of a country as the function and purpose of national education in article 3 of the National Education Law states (UU Sisdiknas) that national education functions to develop and assist noble national character and civilization in the framework of educating the nation. So that the ultimate goal of education is to produce superior and highly competitive resources and have high achievements, based on PP No. 19 of 2005 article 19 paragraph (1). Vocational school (SMK) is educational institutions that fall into the category of secondary education institutions and formal education institutions in Indonesia (Kurnia et al., 2014; Malloch & Helmy, 2015; Triyono & Mateeke Moses, 2019; Verawardina et al., 2018). In particular, vocational schools have explicitly designed objectives to educate students to work in various professions. As part of the formal education system in Indonesia, the mission of vocational schools is to educate students to prepare them to compete in the labor market, foster a professional attitude, and prepare a middle-level

workforce to meet the needs of global business and industry (Alamsyah et al., 2022b; Indarta et al., 2021; A. A. Mon & Anifah, 2018).

PP No. 19 of 2005 article 19 paragraph (1) states that educational institutions carry out learning processes in an interactive, inspiring, fun, challenging, motivating students to participate actively, and provide sufficient space for the initiative, creativity, and independence according to their talents, interests, and the physical and psychological development of students. However, one of the most fundamental problems related to this is the problem of the low quality of education as a whole which extends to all types and levels of education, especially in vocational education. One of the obstacles that hinder the provision of Human Resources (HR), who have the knowledge and skills needed to meet the nation's development needs in various fields of expertise, is the low quality of the vocational education that is held (Komara, 2018; Mahanal, 2014; Rosnaeni, 2021; Tilaar H.A.R, 1998). One of the obstacles that hamper the provision of human resources. The evaluation results of Vocational Schools as a form of antithesis and concern for the world of education are as follows 1) Not being able to develop the potential and nature of students to the fullest; 2) Have not being able to organize fun Teaching and Learning Activities (KBM); 3) Not being able to produce graduates who have moral integrity (Hadijaya, 2012).

SMK is a place to produce quality educational outputs capable of marketing the labor and industrial world. It is crucial to improve the quality of education and its relevance to the needs of the industrial world and the economy. However, based on the findings of the initial investigation conducted by the researchers, it was shown that, generally, the source of problems in vocational schools is the quality of their education. One of the factors is the relatively inadequate quality of teachers, the unwillingness of teachers to follow technological developments and seminars in the field of technology, the inaccuracy of the learning methods used, the lack of availability of quality books (literature), and salary problems (Ismail, Nopiah, Rasulullah, & Leong, 2017; Misbah, Gulikers, Dharma, & Mulder, 2019, 2020; Sasmoko, Noerlina, Indrianti, & Wahid, 2020; Suharno, Pambudi, & Harjanto, 2020; Triyono & Mateeke Moses, 2019).

In the Law of the Republic of Indonesia Number 14 of 2005 Concerning Teachers and Lecturers, it is written that competence is a set of knowledge, skills, and behaviors that must be owned, internalized, and mastered by teachers or lecturers in carrying out professional duties. According to RI Government Regulation No. 19 of 2005 concerning National Education Standards article 28, educators are learning agents who must have four types of competencies. These competencies are personal competence, social competence, professional competence, and pedagogical competence. These four competencies can be the basis of a teacher in developing learning strategies. Thus, students will feel happy in class and satisfied with receiving learning materials and teacher messages.

Still based on the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers, it also regulates the rights of teachers to obtain opportunities to improve competence as well as the obligations of teachers to enhance and develop academic qualifications and competencies sustainably in line with developments in science, technology, and art. Efforts to improve the quality and competence of teachers on an ongoing basis are called Continuing Professional Development (PKB), described in Permenegpan and Bureaucratic Reform No. 16 of 2009, that PKB is the development of teacher competence which is carried out according to needs, gradually and continuously to improve its quality. PKB can be carried out through skills development activities in the form of facilitation or training activities held by schools as learning organizations (learning organizations). In connection with the function and role of schools in facilitating PKB, there should be a positive synergy of stakeholders in schools to create programs to improve teacher competency, particularly in the ICT field.

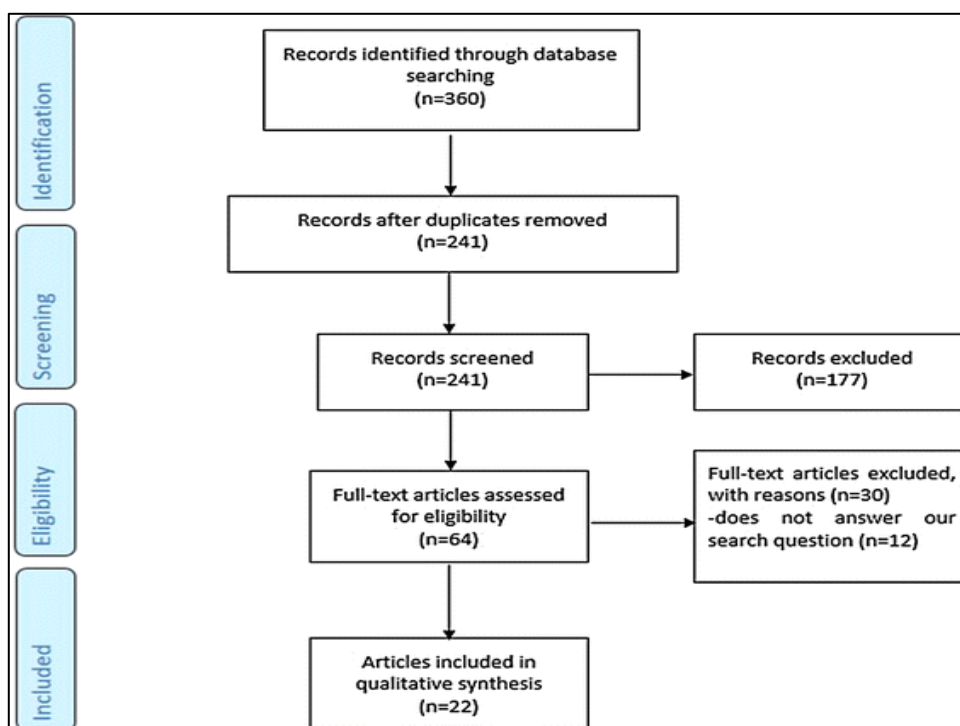
The problem regarding the lack of competency of vocational school teachers is not new, seeing that there have been many efforts made to improve the quality of vocational school teachers through various pieces of training organized by government and non-governmental institutions ((Abdurrahman, Parmin, & Muryanto, 2022; Ali, Mawardi, Tri, & Yanto, 2019; Angriani & Dayat, 2019;

Arief et al., 2020; Eliza & Husnaini, 2019; Elvanny Myori, Hidayat, Eliza, & Fadli, 2019; Sugiarto, Amin, Purwanto, Arif, & Putra, 2019).

The description above is sufficient to explain how teacher competence is an essential factor in the success of schools in achieving the goals and functions of education, including in vocational schools. If previous researchers focused more on the focus of their articles on methods and measuring one particular type of training given to vocational school teachers as a competency effort, then in this article, I chose to focus on viewing, completing, and comparing vocational teacher training related to the development of related competencies. Previous researchers have discussed ICT. Thus, this paper can fill the gaps from previous research and become material for designing future vocational teacher training.

## 2. METHODS

The method in this study is Literature Review using ScienceDirect and Google Scholar for publications published between 2015 and 2022 and displaying them through the Mendeley App. From the search, 360 articles were obtained, screened, and produced 241 after duplicates were removed. The process of screening literature can be seen in **Figure 1**. Some keywords used when searching were Indonesia, Technical and Vocational Education and Training (SMK), Teachers, Competence, Competence and Issues, ICT-related competencies, and the effectiveness of teacher training. These expressions are all related to the topic of inquiry. The Literature Review process is divided into four stages: first, Planning in the form of designing review questions and planning methods. Second, Data Collection consists of searching for keywords, screening titles, abstracts, filtering & assessment, and data extraction). Third, the Analysis Stage in the eyes of the results of the data collection is analyzed descriptively and thematically. Fourth, ending with Synthesis (discussion). By synthesizing research results through a systematic review approach and presenting them in actionable messages (policy briefs and policy papers), the facts are more conclusive, comprehensive, and balanced to be conveyed to stakeholders. The limitation of this research is that the number of related previous studies still needs to be higher, so parts of the data are analyzed to be less in-depth.



**Figure 1.** The process of screening literature

### 3. FINDINGS AND DISCUSSION

#### 3.1. *An Overview of the Competence of Vocational Teachers in Indonesia*

Vocational school teachers' lack of knowledge and ability related to information and communication technology (ICT), like pedagogical understanding, job profiles and competency models, skills training, and work experience, are "significant findings" that make the situation worse. It is the already difficult situation even more difficult. Knowledge of ICT is essential for vocational teachers. Using ICT helps teaching and learning develop smoothly, creating an engaging teaching environment, helping teachers to prepare teaching materials, and allowing teachers to explore new knowledge. In a vocational institution, a leader and a teacher must be able to employ technological mechanisms to improve knowledge integration and see ICT as a powerful force that can revolutionize the teaching and learning process. Teachers need to be trained in ICT-based programming to improve their ability to teach using ICT. Teachers should be trained to build a technology-rich company teaching and learning environment and motivated to use ICT as a powerful tool that can revolutionize teaching and learning.

It is a challenge for teachers to build self-development and training relevant to their different disciplines because of the teacher's model and competency framework. The level of ability every teacher should have, use the essential competencies possessed by teachers, and deal with problems in developing teacher professionalism (Kumar, 2020; Shaffer & Thomas-Brown, 2015). To develop a solid knowledge of subjects, pedagogical abilities, the ability to collaborate well with various students and colleagues, the ability to contribute to institutions and professions, and the capacity to develop constantly, the teacher's personal history should be considered. Due to the lack of training, SMK teachers need help conveying technical knowledge and providing practical education. Vocational school teachers' lost proficiency due to a lack of training in classification in the skills of potent subjects. It is recommended that teachers seek extensive training in businesses and organizations that provide classification programs. The problems teachers face, such as lack of exposure to teaching, lack of expertise, and overwork, have led to a decrease in the variety of teaching approaches. Although the teaching approach is more like regular/traditional classes, students still anticipate more active teaching strategies. Competency development, which helps in maintaining or improving personnel function, learning, and career competence, is thus an essential component of efficiency management, which includes all activities carried out by the company (Bonnes & Hochholding, 2020; Cao et al., 2019, 2021; Drogas & Pappas, 2015). Teacher preparation is a significant logical aspect of ensuring educational goals can be achieved. Teachers must complete training to advance their skills.

Almost 8.49% of vocational skills institutions have unemployed graduates (BPS Indonesia, 2021) due to factors such as the need for a curriculum relevant to industry needs. There is a correlation between the low quality of teachers in vocational institutions and the lack of experience they have in the classroom. The teacher's effectiveness is an indicator of the quality of a good teacher, which in turn is an indicator of the quality of the students taught by the teacher. During the early years of a teacher's career, the level of experience a teacher has is the factor that makes the most difference.

#### 3.2. *Effectiveness of ICT-related training*

Technology-based learning will help educators in the Industrial Revolution 4.0 era, especially vocational teachers who teach in productivity fields (engineering subjects). The problem faced is the need for teachers to use ICT as learning media. The rapid development of Information and Communication Technology (ICT) has impacted the development of the industrial revolution 4.0. The development of ICT has shifted learning orientation from outside-guided to self-guided. In addition, ICT also plays an essential role in updating the conception of learning that is more up-to-date, flexible, effective, and efficient. The main goal is to solve learning problems and facilitate learning to improve educational quality performance (Sulaiman & Dashti, 2018). The results of compiling articles related to

competency development efforts in the field of ICT for vocational teachers show that various parties have tried to facilitate this by giving relevant training materials. Research conducted by (Mustaridi, 2020) on training for ten teachers at SMK Negeri 1 Mesuji Raya in improving the ability of teachers to use computers in learning through ICTDISMK training. From the analysis of this research, there was an increase in the ability of teachers to use computers through ICT training at SMK Negeri 1 Mesuji Raya, and it can be concluded that ICT training can improve teachers' abilities to use computers.

ICT has a role in producing various learning material products that are far more interesting to learn, have a highly interactive element, and are easy for students to understand. All these advantages can speed up the learning process. More than that, ICT can also deliver various learning materials to students without the limitations of distance and time by utilizing software engineering as the medium (Eliza & Husnaini, 2019). To be able to manage software-based learning, of course, a teacher must first be able to use software related to the subjects he teaches. For example, training related to software engineering was researched (Eliza & Husnaini, 2019), namely the NI Multisim software training, which was attended by 15 SMK Negeri 1 Sutera teachers who teach Productive subjects (Engineering). NI Multisim Software is software engineering in electricity and electronics, namely NI Multisim and Proteus software. NI Multisim is application software that draws and simulates the behavior of electronic circuits, both analog and digital (Ptak et al., 2022, NI Multisim is application software that draws and simulates the behavior of electronic circuits, both analog and digital (Ptak et al., 2022), which can be used to improve the quality of learning in Vocational High Schools, especially in the subject of media, electrical circuits, and electronic circuits (Sulaiman & Dashti, 2018). The rating score for the reaction indicator reached 63, and the outcome indicator scored 63. These indicators show that most participants believe that the implementation of the training has provided profound and practical benefits in helping participants improve their self-quality.

Various information and communication technology application software is currently developing in society and is ready to be utilized optimally for educational purposes. Information dissemination regarding E-learning-based applications is one of the urgent areas for training and mentoring for teachers, given the importance of using e-learning in learning (Tsiatsos et al., 2021). One e-learning media will be used in training by the community service team is the Schoology interactive learning media. Schoology is one such website that offers classroom-like learning. (Rosy et al., 2018) conducted research by providing training. The participants who attended the training were 50 MGMP Office Administration Teachers in Jombang Regency. The results of this training were that 87.27% of teachers strongly agreed, and 12.72% agreed that e-learning media training materials with the Schoology application could help increase teachers' awareness and willingness to apply interactive learning media in schools. The results of this training were that 87.27% of teachers strongly agreed, and 12.72% agreed that e-learning media training materials with the Schoology application could help increase teachers' awareness and willingness to apply interactive learning media in schools. In addition, the results of the teacher response questionnaire stated that 72.72% strongly agreed and 27.28% agreed that the material provided in this teacher training was relevant to the 2013 curriculum.

One of the media that is quite familiar that is used in the E-learning method is Google Classroom. Therefore, (Sari et al., 2019) conducted training for SMK ISFI Banjarmasin teachers regarding the use of Google Classroom. This activity aims to optimize the learning process at SMK ISFI Banjarmasin and produce a google classroom module. In addition, this activity contributes to increasing teacher knowledge and skills in using Google Classroom as a learning medium. The use of Google Classroom is expected to make the learning process fun so that it has a positive impact on student learning outcomes and improves the quality of teacher performance. Through this activity, the participants felt an increase; they became more aware of the benefits and efficiency obtained from Google Classroom and using Google Classroom, which will be used in the learning process in the subjects they taught.

Teachers' competence is directly related to the competence of graduates from a vocational school. Therefore, the availability of human resources in education in Vocational High Schools, especially in the Computer Network Engineering major, is essential. However, the lack of vocational teachers with

a computer science background has resulted in a lack of knowledge that can be transferred to students. Therefore it is necessary to have training in order to be able to increase teacher knowledge and improve the competency of vocational students who will later become provisions when they graduate and enter the world of work. (Angriani & Dayat, 2019) Conducted Programming and Computer Networking Training at Vocational High Schools in Jayapura City, especially at SMK Negeri 2 and SMK Negeri 3 Jayapura. This training aims to provide an understanding of algorithms in programming, create simple application programs up to the installation process of the XAMPP application and provide an explanation of the basic concepts of computer networks, simulation, and configuration of proxy router devices that can be used to help improve teacher and student competence. From the results of the provisional evaluation, it was found that there was efficiency which showed an increase in knowledge of 19.8% at SMK Negeri 3 Jayapura for web programming material, and an increase in knowledge of 21.8% at SMK Negeri 2 Jayapura for computer network material.

The next challenge related to technological developments is the changing trend towards mobile games, which has increased workforce diversity. This trend has given rise to various new job fields that require training to increase the capabilities of prospective workers and prepare prospective workers who can meet the needs of current employment trends in various fields (Islam et al., 2010; Mashelkar, 2018; Plaza et al., 2011). Seeing the prospects for work in the game field, especially mobile-based games (mobile games), are promising, making competence or expertise in developing mobile games necessary to be carried out in schools, especially Vocational High Schools (SMK). (Hidayat et al., 2020) conducted educational Mobile Game Development training for 30 Vocational School Teachers in the Field of Computer Technology and Informatics in Malang City from SMKN 2 Singosari, SMKN 4 Malang, SMKN 6 Malang, and SMKN 10 Malang. The purpose of this article is to describe activities to improve vocational school teachers' skills in computer technology to develop mobile educational games. From the results of the questionnaire assessment, it was found that 85 percent of teachers understood the characteristics of various games. As many as 80 percent of teachers have been able to develop mobile educational games. This result shows the effectiveness of this training.

Based on some of the examples of ICT-related training described above, the effectiveness of providing training to vocational teachers is giving positive results. Teachers, as training participants, can absorb new information and practice it in teaching methods to improve their competencies. Even so, why is the competency of SMK teachers still considered inadequate when training can be a powerful solution to overcome this? Referring to ICT training/training that teachers have participated in, from the data presented by (Nur Hidayat & Alfian Mizar, 2016), it is obtained that most of the teachers are adaptive, normative, and productive and stated that the intensity in participating in ICT training was not good. This irony is because the activity program ICT training in schools for teachers has yet to be encouraged, on average. Hence, it is teacher intensity only to participate in training once a year. Implementing ICT training can become a medium for teachers to improve their competence to support the concept of ICT integration.

When viewed from a small scale, the training is practical, but on a large scale, the competence of teachers in SMK is insufficient. Several aspects can affect the effectiveness of training. First, the quality of the resource persons who contribute to the training. Second, the duration of time is an important part that needs to be considered because the suitability between the duration of time and the objectives of the training is still. Third, post-training evaluation is quite supportive for efforts to improve the quality of teacher performance (Dwihartanti & Sasmita Wijayanti, 2018). There is a positive relationship between teacher competence and workload and teacher work stress. The competence of teachers and workload together can determine and contribute to work stress. Teacher competence can be increased by minimizing their work stress and workload together (Akmaludin et al., 2017)

#### 4. CONCLUSION

Problems related to the level of teacher competence should be addressed. The role of the teacher is vital in producing students who are also competent. Vocational schools are where ICT developments

are received, managed, and utilized efficiently. Therefore, the provision of relevant ICT tools in the classroom, the use of ICT in the teaching-learning process, and ICT-related skills training are urgently needed to improve teacher competency. Vocational school teacher education and training must be carried out continuously by considering the needs analysis for teacher development. Organizing training is very important to improve the quality of learning and teacher careers. Even though the training materials and methods and the teacher's response as a participant increased efficiency, more is needed. Other influencing factors include the quality of trainers, timing of training, continuation, and evaluation, including the high teacher workload. Limitation of this study is the limited amount of literature, so there are still gaps in the analysis and discussion of research results. Soon, the researcher wants to develop competency models that can be used by technical instructors working in public institutions responsible for skills training.

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