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Unlocking the potential of vocational skills: How vocational high school students' preferences for teachers' use of digital technology influence telecommunication technical skills

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ABSTRACT

Digital competence is crucial for teachers to utilize digital technology in the current era of learning. Especially for vocational high school teachers, face the challenge of designing effective learning strategies by harnessing digital technology to enhance students' vocational skills. The research aims to investigate vocational high school students' preferences regarding the use of digital technology by teachers and its influence on their vocational skills in VSAT (Vocational Satellite). While this topic has been rarely studied among vocational high school students, understanding students' perception of teachers' digital competence and its impact on their vocational skills can provide valuable insights into how digital technology usage can enhance vocational skills and better prepare students for success in the workforce. This study employs a quantitative method with descriptive and simple linear regression analysis. Data collection involved distributing questionnaires directly and online through Google Forms, which were voluntarily filled out by 123 students from three SMKs in the Bandung and Cimahi regions. The research findings reveal that students' preferences for teachers' use of digital technology fall under the good category, with an assessment interval of 78.2%. Additionally, a positive influence is found between vocational high school students' preferences for teachers' use of digital technology and their vocational skills in VSAT. The study is expected to provide valuable input for teachers and schools to implement teaching methods that support the development of students' vocational skills through optimal utilization of digital technology.

1. Introduction

The presence of technology has become an integral part of daily life and is inseparable, especially in the field of education. Its utilization has become a crucial component at all levels of education, therefore it is of utmost importance to enhance digital competence by leveraging technology (Ghomi & Redecker, 2019). At the same time, the European Union acknowledges that digital competence is one of the eight essential competencies for lifelong learning (Instefjord & Munthe, 2016). Digital competence is a set of skills required in the digital era, and it is also a skill set

that needs continuous improvement, especially for teachers in Vocational High Schools. These teachers are expected to provide instruction to students in line with specific competencies in their respective fields. (Barboutidis & Stiakakis, 2023; Rahmawati, Abdullah, Widiaty, & Islami, 2022). In this current era, teachers should adapt to technological advancements as digital competence is essential for the continuity of the learning process. In other words, teachers should be capable of integrating technology into their teaching methods by selecting effective learning media relevant to their fields. Vocational education comprises cognitive, psychomotor, and affective aspects, wherein students are required to develop skills in their chosen fields, preparing them for the workforce (Syauqi, Munadi, & Triyono, 2020). However, in reality, many vocational high school graduates face unemployment because companies feel dissatisfied with the skills possessed by the students, which do not align with their needs. (Hikmawan & Fauzi, 2019). Therefore, one of the essential skills to possess is vocational skill, which refers to the competence to perform specific jobs. Vocational skills require a training or learning process that focuses on developing expertise and a profound understanding, enabling learners to master skills relevant to their chosen field (Guo, Zhan, & Liu, 2009). If students possess vocational skills, it can open up numerous opportunities to secure suitable employment and boost their confidence in social life (Gambo, Adedapo, Gambo, & Ejalonibu, 2021).

In the current era, many agree that having and developing vocational skills is highly crucial in the workforce (Hassall, Joyce, Montano, & Anes, 2003). The research conducted in Nigeria by Inusa, Diana (Inusa & Diana, 2021), and Ogunleye (Ogunleye, 2014) explains that vocational skills can have a positive impact and create easier employment opportunities for former inmates in Nigeria. This is because they are provided with vocational training programs during their time in prison, which helps them reintegrate into society successfully. By acquiring vocational skills, former inmates are better equipped to find job opportunities, making it easier for them to reintegrate into society and lead a productive life after their release from prison. The research conducted by Hassall, Joyce, Montano, and Gonzalez reveals that students from England and Malaysia, along with entrepreneurs, share the view that vocational skills should be introduced in secondary schools, and the development of vocational skills is essential for them to perform well in their careers. They emphasize the importance of vocational skill development through a learning process that includes comprehensive vocational skill training. This enables individuals to excel in their respective fields and succeed in their professional endeavors (Hassall et al., 2003; Hassall, Joyce, Montaño, & González, 2010). Vocational skills are typically taught by teachers in Vocational High Schools who possess knowledge and expertise in specific fields. They impart the necessary skills required to enter the workforce. The competence of teachers in the learning process plays a crucial role in determining whether vocational skills can be acquired effectively (Nnodim & Johnwest, 2016). Teachers play a crucial role in the learning process by employing appropriate teaching methods and utilizing relevant media for instruction. Consequently, teachers are expected to possess teaching competencies, including digital competence, that align with the advancements of the time (Wardani & Santosa, 2022). Digital competence is essential for a teacher to enhance the quality of education by integrating knowledge and technology skills, keeping pace with the advancements in Information and Communication Technology (ICT) (Svensson & Baelo, 2015). Technological skills, particularly in the field of telecommunications refer to technical skills, which encompass the ability to maintain, repair, and enhance the quality of telecommunication services (Chumaidiyah, 2012). Higher education in the field of telecommunications in Pakistan also focuses on producing graduates with high-quality technical skills (Muhammad, Aurangzeb, & Tarique, 2009).

Digital competence plays a crucial role in the teaching process carried out by teachers and significantly influences the instruction of vocational skills to students, which in turn has a profound impact on their future career sustainability. Many researchers have explored the topic of digital competence, but most studies tend to focus on self-assessment of digital competence, such as teachers and students assessing their digital skills. There is a scarcity of research that investigates students evaluating their teachers' digital competence. Previous studies related to vocational skills have been conducted primarily with inmates and accounting majors, leaving a limited number of studies discussing vocational skills among Vocational High School students, particularly in the field of telecommunications. Vocational skills are also essential in the learning process at Vocational High School to provide students with a comprehensive understanding of the knowledge and abilities they

learn, relevant to the demands of the workforce. Moreover, as the telecommunications field remains ever-present and constantly evolving, students can have confidence in their skills and abilities, ensuring success in their future careers. Based on the previous explanations, researchers are motivated to investigate how digital competence, particularly the use of digital technology by teachers, can influence the vocational skills of Vocational High School (SMK) students majoring in telecommunications. One of the objectives of vocational education is to teach vocational skills to students, enabling them to pursue careers in the industrial world. However, it is undeniable that the use of digital technology is inseparable from almost all industries. Therefore, understanding students' perceptions of their teachers' use of digital technology with their vocational skills can help them realize that leveraging digital technology can enhance vocational skills and prepare them for success in the workforce. This research aims to provide valuable references and beneficial information for teachers and schools in delivering effective training to enhance their ability in implementing teaching methods that support the development of students' vocational skills by maximizing the use of digital technology. The findings of this research are anticipated to contribute positively to the advancement of vocational education and its alignment with the digital era, ultimately empowering students with relevant skills for their future careers.

2. Method

This research adopts a quantitative method and employs descriptive and simple linear regression analysis. The survey method is used to collect information from a specific population or sample that is the focus of the study. The sample for this research consists of 123 students from three Vocational High Schools, namely SMKN 1 Cimahi, SMK Telkom Bandung, and SMK UT PGII. The sampling technique used is purposive sampling to obtain data that represents the population in a representative manner. The sample criteria are students from Vocational High Schools who are currently studying or have studied the subject or material related to VSAT.

The data collection tool used in this research is a questionnaire. The questionnaire is voluntarily filled out by Vocational High School students, both in-person and online through Google Forms. There are two variables in the research instrument: the use of digital technology by teachers as the independent variable (X) and vocational skills as the dependent variable (Y). The construction of the instrument is based on the adaptation of previous research on the use of digital technology by teachers (Redecker, 2017) and vocational skills (Hassall et al., 2003, 2010). For the variable of the use of digital technology by teachers, the framework used is The European Framework for the Digital Competence of Educators (Redecker, 2017). The framework aims to demonstrate how an educator utilizes digital technology in their teaching practices (Wardani & Santosa, 2022). The framework comprises six aspects for the variable of the use of digital technology by teachers, which are professional engagement, digital resources, teaching and learning, assessment, empowering learning, and facilitating learners' digital competence. For the variable of vocational skills, it consists of six aspects: communication skills, group working skills, problem-solving skills, time management, information technology, and other skills, values, and knowledge.

3. Results and Discussion

3.1. Results

3.1.1. Descriptive Statistical Analysis

The use of descriptive statistical analysis in this research is to provide a general overview or summary of the independent and dependent variables. The descriptive analysis includes measures such as mean, standard deviation, and confidence intervals. The results of the descriptive statistical analysis are presented in Table 1.

Table 1. Descriptive Statistical Analysis Results for the Variable Preference of Vocational High School Students Towards the Use of Digital Technology by Teachers in VSAT Learning

	Aspects	Mean	Std. Deviasi	Assessment Interval (%)
The Use of Digital Technology by Teachers	Professional Engagement	4.22	0.75	84.4%
	Digital Resource	3.87	0.66	77.4%
	Teaching and learning	3.74	0.75	74.8%
	Assessment	3.83	0.87	76.6%
	Empowering Learning	3.80	0.77	76%
	Facilitating Learner's Digital Competence	4.00	0.68	80%
	Average	3.91	0.75	78.2%

In Table 1, descriptive statistical analysis for the variable of the use of digital technology by teachers (X) is conducted to determine the vocational high school students' preference towards the use of digital technology by teachers in VSAT learning. Table 1 shows that the mean value is 3.91, the standard deviation is 0.75, and the confidence interval is 78.2%, indicating that vocational high school students' preference towards the use of digital technology by teachers in VSAT learning falls under the "good" category.

3.1.2. Test of Normality

The test of normality can be observed from the significance value listed in the SPSS output table used. The significance value obtained in this normality test is shown in Table 3.2 as "Asymp. Sig. (2-tailed)" with a value of 0.567. This value is greater than 0.05 (0.567 > 0.05), fulfilling the requirements for the Kolmogorov-Smirnov normality test. Therefore, it can be concluded that the research data is normally distributed.

Table 1. Results of Normality Test Using SPSS Version 20

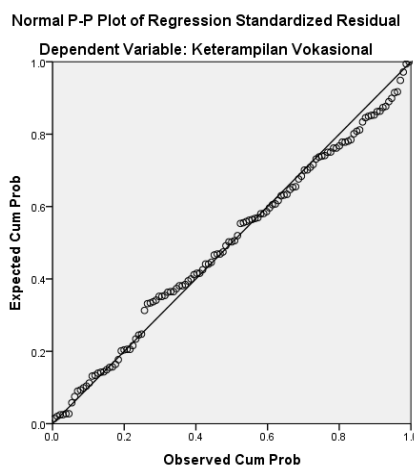| One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		123
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	0.31212271
Most Extreme Differences	Absolute	0.071
	Positive	0.057
	Negative	-0.071
Kolmogorov-Smirnov Z		0.786
Asymp. Sig. (2-talled)		0.567

Figure 1. P-Plot Graph for Testing Data Normality

In Figure 1, the P-Plot graph for the normality test conducted in SPSS is presented. Based on the "Regression Standardized Residual" plot, the data points consistently cluster around and follow

the diagonal line. According to the criteria, it can be inferred that the residual values or the data are normally distributed.

3.1.3. Test of Linearity

Using SPSS version 20 software for the linearity test, the significance value for "Deviation from Linearity" is found to be 0.236. This value satisfies the linearity test requirement as the Deviation from Linearity is greater than 0.05 (0.236 > 0.05). Therefore, the linearity test on the research data indicates a significant linear relationship between the variable of the use of digital technology by teachers (X) and the variable of vocational skills (Y). The results of the linearity test are presented in Table 3.

Table 3. Results of the Linearity Test Using SPSS Version 20

			Sum of Squares	df	Mean Square	F	Sig.
Vocational Skills * The Use of Digital Technology by Teachers	Between Groups	(Combined)	19.118	34	0.562	6.058	0.000
		Linearity	15.401	1	15.401	165.919	0.000
		Deviation from Linearity	3.717	33	0.113	1.213	0.236
	Within Groups		8.168	88	0.93		
	Total		27.286	122			

3.1.4. Simple Linear Regression Test

The simple linear regression test is a part of the data analysis in this research, which aims to examine the influence of the variable of the use of digital technology by teachers (X) on the variable of vocational skills (Y). Tables 3.4 and 3.5 present the results of the simple linear regression test.

Table 4. Correlation and Coefficient of Determination Values in Simple Linear Regression Test Using SPSS Version 20

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.751	0.564	0.561	0.31341

The results of the test in Table 4 show a correlation value with the symbol "R" of 0.751 and a coefficient of determination (R-Square) of 0.564. This indicates a strong relationship between the two variables, and the variable of the use of digital technology by teachers (X) has an influence of 56.4% on the variable of vocational skills (Y).

Table 5. Results of Simple Linear Regression Test Using SPSS Version 20

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.666	0.185		9.009	0.000
	The Use of Digital Technology by Teachers	0.595	0.048	0.751	12.522	0.000

In Table 5, there is a value for the intercept (α) of unstandardized coefficients, which is 1.666. This value is a constant and can be interpreted as when the variable of the use of digital technology by teachers (X) is absent, the value of the variable of vocational skills (Y) will be 1.666. On the other hand, the value of "b" or the regression coefficient is 0.595, which means that for every 1% increase in the level of the variable of the use of digital technology by teachers (X), the variable of vocational

skills (Y) will increase by 0.595. Considering that the regression coefficient is positive (+), it can be concluded that the variable of the use of digital technology by teachers (X) has a positive influence on the variable of vocational skills (Y). These results can be interpreted into the linear regression equation as follows:

$$Y_i = a + bX_i + e_i \tag{1}$$
$$Y_i = 1.666 + 0.595 \tag{2}$$

3.1.5. Significance Test

Based on the t-test results provided in Table 3.6, the obtained significance value is 0.000, and the t_{table} is 12.522. Using the formula to find the t_{table} value with degrees of freedom (df) (0.025; 121), the t_{table} value is determined to be 1.98. Since the calculated t_{table} > t_{table} value (12.522 > 1.98), and the significance value (Sig.) is less than 0.05, it can be concluded that the null hypothesis is rejected. This indicates that there is a significant effect of the variable of the use of digital technology by teachers (X) on the variable of vocational skills (Y).

Table 6. Results of T-Test Using SPSS Version 20

		Coefficients[a]				
		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	1.666	0.185		9.009	0.000
	The Use of Digital Technology by Teachers	0.595	0.048	0.751	12.522	0.000

3.2. Discussion

3.2.1. Vocational High School Students' Preferences for the Use of Digital Technology by Teachers in VSAT Learning

One of the objectives of this research is to gain an understanding of vocational high school students' preferences for the use of digital technology by teachers in VSAT learning. This is achieved through the distribution of questionnaires both in-person and online using Google Forms. The study is based on the European Framework for the Digital Competence of Educators as researched by Redecker (Redecker, 2017), which analyzes six aspects of the use of digital technology by teachers professional engagement, digital resources, teaching and learning, Assessment, empowering learning, dan facilitating learners digital competence. The researchers identified 123 vocational high school students who are currently studying or have already studied the VSAT curriculum. This study focuses on the student's preferences in assessing the use of digital technology by their teachers, which differs from previous research that predominantly focused on the perceptions of teachers, students, and learners regarding their digital competencies (Svensson & Baelo, 2015; Zhao, Sánchez Gómez, Pinto Llorente, & Zhao, 2021).

Based on the results of the descriptive analysis, student's preferences for the use of digital technology by teachers fall into the "good" category. In other words, teachers are proficient in utilizing and optimizing digital technology in the VSAT learning process. These findings support previous research conducted by Lucas, Haja, Siddiq, Moreira, and Redecker (Lucas, Bem-haja, Siddiq, & Moreira, 2020) who also found that teachers with good digital technology usage skills can integrate digital technology into teaching to enhance learning strategies. When planning effective learning strategies and employing digital technology, teachers must have confidence that their digital competence can be utilized for the teaching process (Antonietti, Cattaneo, & Amenduni, 2022).

In Table 3.1, it can be observed that in the aspect of teacher digital competence, the "professional engagement" aspect receives the highest score compared to other indicators. This finding indicates that students perceive teachers as proficient in optimizing the use of digital technology in the aspect of "professional engagement." In this regard, teachers actively use digital technology as a means to communicate directly with students, both regarding assignments and

learning materials. Teachers can create dynamic and flexible interactions with students, fostering closer relationships beyond the context of learning.

Regarding the aspect of "digital resource," the results show that students perceive teachers as skilled in effectively utilizing digital technology to provide and select materials suitable for VSAT learning, while also safeguarding sensitive digital content. Additionally, teachers demonstrate a respectful attitude towards copyright regulations by providing references to the materials used, enabling students to utilize appropriate resources in VSAT learning. This instills an awareness in students about the importance of respecting internet resources and protecting copyrights by avoiding plagiarism. Consequently, teachers have created a learning environment that supports the responsible use of digital resources and teaches students to value copyright protection

The "Teaching and learning" aspect obtained the lowest score in the descriptive statistics, but students still perceive that teachers excel in managing, organizing, and integrating digital technology into the VSAT learning strategies. During several VSAT learning sessions, teachers use digital technology such as projectors and laptops to present related learning materials. This use of technology has a positive impact on the success and efficiency of the learning process. Additionally, teachers provide instruction on the installation and operation of software needed to bridge the gap between theory and practice in the VSAT learning process. Furthermore, teachers create video content for VSAT learning materials to support independent learning, enabling students to better comprehend VSAT subjects.

The "assessment" aspect of teacher digital competence contributes significantly to enhancing existing assessment strategies through the integration of digital technology. Based on Table 3.1, it can be concluded that students perceive that teachers effectively integrate digital technology to choose appropriate and effective assessment strategies in VSAT learning. Digital technology such as Google Classroom, email, and software allows teachers to provide feedback to students using evidence obtained from digital tools. Moreover, teachers can use the data collected from digital technology to make data-driven decisions in improving student learning. As a result, the use of digital technology in assessment strategies not only provides timely feedback or evaluation to students but also enables data-based decision-making to support students' digital learning progress in VSAT.

The "empowering learning" aspect provides opportunities for all students to engage actively in learning using digital technology. This can motivate and encourage students to develop creative thinking skills. According to Table 4.1, students rate teachers highly for motivating interesting means, such as using videos in VSAT learning. This approach can be beneficial for students to explore and understand VSAT subjects more visually and tangibly through videos. Additionally, teachers provide opportunities for students who do not have access to digital technology or have special needs to participate in learning at their own pace and level. This inclusive approach helps students feel valued and supported in their VSAT learning journey

The last aspect, "facilitating learners' digital competence," refers to the teacher's ability to support students' digital competence development in the learning process. Based on Figure 3.1, students perceive that teachers excel in integrating digital technology to assist and support them by teaching and guiding them in using digital media to find information related to VSAT subjects. Teachers also teach students how to cite proper reference sources accurately. Additionally, teachers are responsible for emphasizing the importance of students understanding the correct use of digital technology.

3.2.2. The influence of vocational students' preferences regarding the use of digital technology by teachers on their vocational skills in VSAT learning

The results of the simple linear regression analysis show a positive influence between vocational students' preferences regarding the use of digital technology by teachers and their vocational skills in VSAT learning. This positive influence indicates that as the preferences of vocational students for the use of digital technology by teachers increase, it leads to an improvement in their vocational skills. This is supported by the analysis of the simple linear regression data, which shows a positive regression coefficient and the t-test results confirm a significant influence between the use of digital technology by teachers (X) and vocational skills (Y). Therefore, it can be concluded that the better the vocational students' preferences for the use of digital technology by teachers in

VSAT learning, the better their vocational skills will be. On the other hand, if the preferences of vocational students for the use of digital technology by teachers in VSAT learning are not favorable, their vocational skills are likely to have limited development

According to the results obtained from Table 3.5, the influence of the variable "use of digital technology by teachers" (X) on the variable "vocational skills" (Y) is 56.4%. This means that approximately 56.4% of the changes in vocational students' skills in VSAT learning are influenced by their preferences for the use of digital technology by teachers. The remaining 43.6% may be attributed to other factors that can also affect vocational students' skills. However, this research has some limitations, such as not discussing the factors that can enhance digital competence (Barboutidis & Stiakakis, 2023) and the potential impact of teachers' use of digital technology on vocational students' skills significantly. Additionally, the study had a limited number of participants, which restricts the generalizability of the findings and reduces the representativeness of the results obtained.

4. Conclusion

This research examines the preferences of vocational high school students towards the use of teacher digital technology in VSAT learning, viewed through six aspects including professional engagement, digital resources, teaching and learning, assessment, empowering learning, and facilitating learners' digital competence. Overall, the findings of the descriptive data analysis indicate that vocational high school students' preferences for the use of teacher digital technology in VSAT learning fall into the 'good' category. Additionally, this study also investigates the influence of vocational high school students' preferences regarding the use of teacher digital technology on students' vocational skills in VSAT learning. Based on the simple linear regression data analysis, it can be concluded that there is a positive and significant influence between vocational high school students' preferences for the use of teacher digital technology and students' vocational skills in VSAT learning. In other words, the better the students' preferences for the use of teacher digital technology in VSAT learning, the better their vocational skills will be. Conversely, if students' preferences for the use of teacher digital technology in VSAT learning are not favorable, their vocational skills are likely to be less developed.

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