Jurnal Pendidikan Vokasi
Volume 13, No. 2, 2023 (192-204)
Online: https://journal.uny.ac.id/index.php/jpv

The influence of digital and vocational information literacy on student learning outcomes

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ARTICLE INFO

Article History
Received:
21 October 2022;
Revised:
15 June 2023;
Accepted:
29 June 2023;
Available online:
19 September 2023

Keywords
Digital;
Literacy;
Vocational

ABSTRACT

Vocational students are confronted by intricate demands once they graduate. Despite the considerable need for vocational graduates in the workforce, most students have a limited understanding of digital and vocational information. This study used a descriptive quantitative method to determine the influence of digital and vocational information literacy on students' learning outcomes in three vocational schools in the Sragen Regency. Cluster Random Sampling was used to select a sample of 111 students. Data on digital and vocational information literacy were collected using a questionnaire, while those on the learning outcomes were obtained from the student's grades. The results showed that digital literacy influences vocational students' learning outcomes with a significance of 0.000 < 0.05. Vocational information literacy influences the students' learning outcomes with a significance of 0.000 < 0.05. Furthermore, digital and vocational information literacy simultaneously influence the students' learning outcomes with a significance of 0.000 < 0.05. These results indicate the necessity to familiarize and increase the students' literacy skills to improve learning outcomes. The results indicated that digital and vocational literacy partially and collectively influenced learning outcomes by 48.2%. Therefore, classroom instruction needs to be structured around learning models that actively stimulate the development of digital and vocational literacy skills, preparing students for workplace competitions. Consequently, teachers should consistently implement learning strategies that create a meaningful connection between the school environment and the realities of the professional world.

How to cite:
Setiyawan, H., Suharno, S., & Pambudi, N. A. (2023). The influence of digital and vocational information literacy on student learning outcomes. *Jurnal Pendidikan Vokasi*, *13*(2), 192-204.
https://doi.org/10.21831/jpv.v13i2.53999

INTRODUCTION

Information and Communication Technology (ICT) has transformed students' learning by providing flexibility and opportunity to obtain knowledge from social media (Moreno-Morilla et al., 2021). ICT and digital technology are used in education, especially during the COVID-19 pandemic when all learning activities are conducted online (Jang et al., 2021). Digital technology advancements facilitate online learning, enabling students to search for information and knowledge independently (Lember et al., 2019). Almost all information is accessed easily, quickly, and without limits using digital technology (Soewandi & Lukman, 2020).

Due to this easy access, individuals need good digital literacy skills (Patmanthara & Hidayat, 2018). Most people understand digital literacy only as writing and reading without considering the understanding, appreciating, and critical thinking aspects (Oktariani & Ekadiansyah, 2020). Technology and opinions about digital literacy change with time and are now interpreted as conveying information by writing, reading, exchanging ideas, speaking, listening, seeing, and thinking critically (Abidin, 2015). Gilster (1997) stated that digital literacy implies using technology and information from digital devices effectively and efficiently in academic, career, and everyday contexts. Digital literacy skills include finding, working on, evaluating, creating, and utilizing the information obtained wisely, intelligently, and carefully (Rasi et al., 2019). These skills foster a critical and creative mentality that helps people obtain the right information (Ahmad, 2022).

The digital literacy skills of Indonesians still need to improve (Rizal et al., 2019). The country is ranked 60th out of 61 countries with low literacy levels, and Finland is first place (Anisa et al., 2022). Due to this weak digital literacy, hoax news often consumes people (De Paor & Heravi, 2020). Furthermore, the weakness contributes to the need for more understanding and effective ways to use digital information media (Mudra, 2020). This requires getting used to digital literacy culture early in the family and school environments (Wulandari & Sholeh, 2021). Indonesia's education should apply digital literacy learning because it is a practical solution to form human resources with character (Asari et al., 2019). Students with digital literacy skills could thrive in an all-digital environment. They could also handle various information, interpret messages, and communicate effectively (Pangrazio et al., 2020). Therefore, this skill relates closely to critical thinking skills and sensitivity in all areas of life (Tohara, 2021).

Indonesia's high unemployment rate could be reduced by vocational education (Ardiansyah & Pramono, 2019; Watrianthos et al., 2022). This education bridges the gap between the curriculum and community needs (Verawadina et al., 2019). Conceptually, vocational education implies the courses and skills that help students prepare for the workforce (Jayanti et al., 2020; Ngadi, 2014). There has been a significant shift in the nature and scope of work from conventional methods to digitization. This transition towards digital technologies greatly influences industries, leading to fierce competition among companies to implement advanced digital systems. As a result, job seekers needing more digital skills often face disadvantages in the hiring process.

In Indonesia, the disparity in digital literacy among job seekers is pronounced. This inequality often leaves some groups needing access to job information, leading to unemployment. To address this, schools must proactively develop and train students to ensure their graduates possess the necessary digital competencies. Improving digital skills enhances graduate performance and supports companies during their transition, helping them maintain competitiveness in the rapidly changing digital landscape. This shows the importance of students having vocational information literacy skills. This shows the importance of students having vocational information literacy skills.

Information literacy is analyzing and understanding information for personal or social life (Mulyono & Ansori, 2020). In line with this, vocational education prepares graduates to be competent and ready to work (Edi et al., 2017). Therefore, vocational information literacy is the students' skill to analyze and understand information to prepare for the industrial world. Therefore, students must train in vocational information literacy skills to learn about the industry (Ali, 2021). Industrial Revolution 4.0 necessitates current and prospective employees to possess suitable skills. The key competencies required in this era include digital, technological, and human literacy (Indrawati & Kuncoro, 2021). Interconnecting with this demand, studies on work readiness, career, and career development imply that work readiness combines skill-based and academic preparedness (Lau et al., 2020).

According to the World Economic Forum's 2015 New Vision for Education Report, students in the 21st century need to develop 16 essential skills, including Information and Communication Technology (ICT) Literacy (World Economic Forum, 2015). ICT Literacy encompasses knowledge of information, computers, digital technology, and the internet. UNESCO defines digital literacy as the fundamental understanding of ICT devices, including the ability to access, manage, comprehend, integrate, communicate, evaluate, and create information safely and appropriately using digital technology in work and entrepreneurship contexts (Lau et al., 2020). Due to its wide application, digital literacy has become crucial for students of all disciplines and ages (Park et al., 2021). Becker

et al. (2017), established that students possessing strong digital literacy have a higher promotion rate. They are also more likely to adapt efficiently to varying work environments than those lacking digital proficiency.

Result or product refers to an activity impact that causes changes in functional inputs. In the learning process, individuals are expected to experience significant changes (Sadapotto et al., 2021). According to Djamarah and Zain (2008), the achievement of activities performed individually and in groups results from learning. Learning outcomes require strenuous efforts, sacrifices, and many change factors (Fahyuni & Istikomah, 2016). Previous studies showed that digital literacy influences student learning outcomes. Students with good digital literacy skills use digital media to complete school work and study (Susilo, 2019). Wright (2012) revealed that there are ten benefits that can be obtained by implementing digital literacy, namely: (1) saving time, (2) learning faster, (3) saving money, (4) more security, (5) getting the latest information, (6) connectivity, (7) making better decisions, (8) simplifying work, (9) creating happiness, and (10) influencing the world.

Sari (2022) stated that vocational information literacy influences student learning outcomes. Students have good work readiness when they have high vocational information literacy. Readiness is also interpreted as preparedness for something (Banjongprasert, 2017). Work readiness is the foundation of personnel preparedness supported by good health and mental or psychological well-being (Sijabat, 2018). It relates closely to the suitability between individuals' understanding, knowledge, skills, and workplace demands (Qomariyah & Az-zahra, 2020). Vocational education teaches people how to work effectively, this is supported by the statement of Perwita (2017) which states that vocational high school graduates are prepared to enter the world of work. Therefore, job readiness is the main source and capital to adapt to work to achieve optimal results (Daud et al., 2017).

Previous research shows that students need digital literacy and vocational information literacy skills that affect their critical thinking and work readiness. Therefore, researchers are interested in conducting a study entitled the effect of digital literacy and vocational information literacy on the learning outcomes of vocational high school students. The study aims to analyze the partial and simultaneous effects of digital literacy and vocational information literacy on the learning outcomes of vocational high school students. This study is unique in terms of the aspects and subjects explored. For example, a previous study conducted by Sari (2022) focused only on the religious aspect, although it showed the impact of vocational literacy on learning outcomes. In contrast, this study focuses on both digital and vocational literacy aspects. The subjects in the previous study were students from general education, while this study explicitly examined vocational high school students.

Due to the different learning design and behavioral characteristics of vocational high school students, it is important to conduct separate research. Unlike general education students who are directed to develop broad knowledge, vocational students are prepared to enter the workforce directly. The importance of imparting digital and vocational literacy skills to vocational students during their education cannot be overstated. Therefore, it is imperative to analyze how these specific skills (digital literacy and vocational literacy) impact their learning outcomes..

RESEARCH METHOD

This study used a descriptive quantitative approach through surveys and literature reviews. In a quantitative study, the data obtained and processed in the form of numbers are analyzed statistically. A descriptive study describes an object or phenomenon broadly. This study used three variables, including digital literacy (X1), vocational information literacy (X2), and learning outcomes (Y). Data for variable X was taken using a questionnaire, while the learning outcomes data were obtained from the students' original scores.

The study was conducted in three vocational schools in Sragen Regency. The schools were selected based on the area representatives. The west, center, and east are represented by SMK Negeri 1 Miri, SMK Negeri 1 Sragen, and SMK Negeri 1 Jenar, respectively. The population of this study were all students of SMK Negeri 1 Jenar, SMK Negeri 1 Sragen, and SMK Negeri 1 Miri in the even semester of the 2021/2022 academic year. Samples were determined using the Cluster Random

Sampling technique by assuming all subjects have the same opportunity and the population has no strata.

From the Cluster Random Sampling technique, 48 students for class XI from SMK Negeri 1 Miri, 46 from SMK Negeri 1 Sragen, and 17 from SMK Negeri 1 Jenar were obtained, totaling 111 students. The procedure started with collecting information from previous studies, making instruments, testing their validity and reliability, distributing them, collecting and processing data, and concluding results. Data were collected using a questionnaire, observations, and documentation. They were analyzed using multiple linear regression analysis with the SPSS application. Figure 1 shows the research framework.

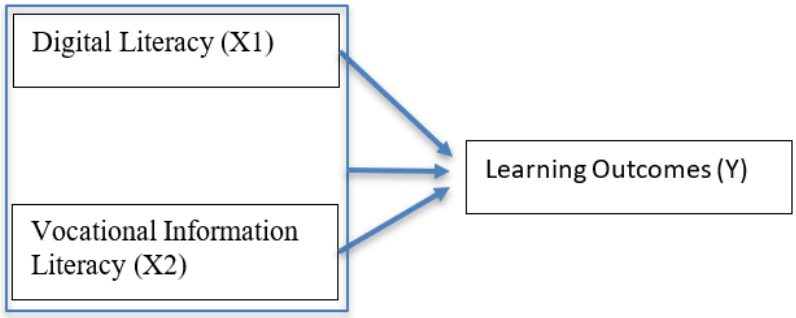

Figure 1. Research Framework

FINDINGS AND DISCUSSION

Findings

Data Description

The questionnaire used to collect digital literacy data has 22 statement items with an answer scale of 1 - 4 (Likert Scale). From statistical calculations, the highest and lowest scores were 81 and 53, with a range of 22 to 88. Furthermore, categorization was carried out using Azwar's theory. The categorization results can be seen in Table 1 and Figure 2.

Table 1. Category of Digital Literacy

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Moderate	51	45.9	45.9	45.9
	High	60	54.1	54.1	100.0
	Total	111	100.0	100.0	

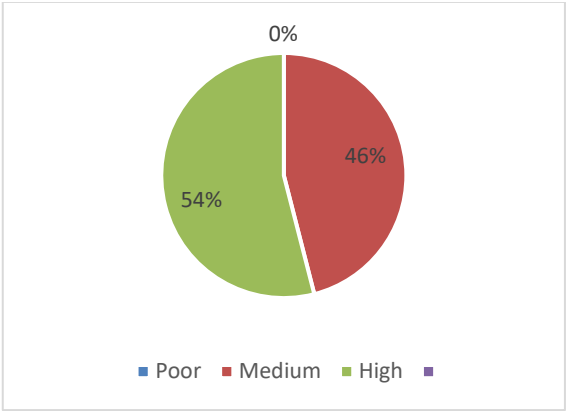

Figure 2. Category of Digital Literary

The vocational information literacy questionnaire consisted of 15 statement items with an answer scale of 1 - 4 (Likert Scale). From the results of statistical calculations, the highest and lowest values were 60 and 39. Categorization was carried out using Azwar's theory, and the results can be seen in Table 2 and Figure 3.

Table 2. Category of Vocational Information Literacy

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Moderate	21	18.9	18.9	18.9
	High	90	81.1	81.1	100.0
	Total	111	100.0	100.0	

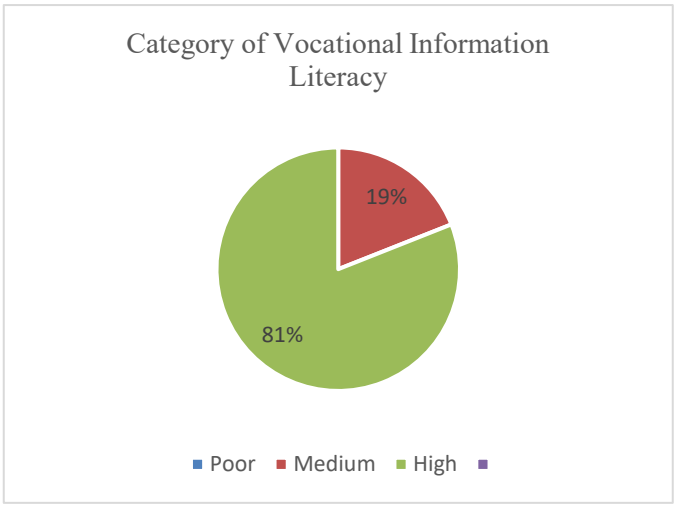

Figure 3. Category of Vocational Information Literacy

The learning outcomes data were obtained from student leger grades. The statistical calculations obtained the highest and lowest scores of 85.66 and 78.32, with a score range of 0-100. Furthermore, categorization was performed using Azwar's theory, and the results were presented in Table 3 and Figure 4.

Table 3. Category of Learning Outcomes

		Frequency	Percentage	Valid Percentage	Cumulative Percent
Valid	High	111	100.0	100.0	100.0

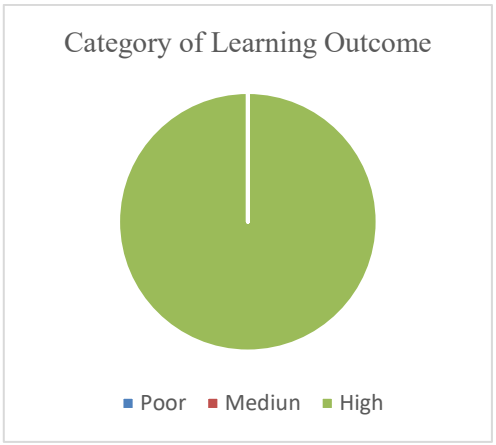

Figure 4. Category of Learning Outcome

T-test

The t-test on the multiple linear regression analysis models aimed to determine each independent variable's partial influence on the dependent variable. A significance value smaller than alpha (< 5% or < 0.05) meant the regression model was statistically significant. The regression analysis used the SPSS program to obtain the results presented in Table 4.

Table 4. T-test Result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	69.332	1.381		50.206	.000
	Digital	.108	.020	.385	5.305	.000
	Information	.125	.019	.472	6.502	.000

The test obtained a significant value of 0.000 for digital and vocational information literacy. Since the significant values were 0.000 < 0.005, digital and vocational information literacy partially influenced the vocational students' learning outcomes.

F-test

Multiple regression analysis using the F (fisher) tested the significance of the regression model. The test aimed to determine the significant influence of digital and vocational information literacy on vocational students' learning outcomes. A value less than 0.05 (< 0.05) indicated that the regression model was statistically significant. Regression analysis was performed using the SPSS program and obtained the results shown in Table 5. The test obtained a significant value of 0.000 < 0.005, implying that digital and vocational information literacy simultaneously influence the vocational students' learning outcomes.

Table 5. F-test Result

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.447	2	46.224	50.225	.000[b]
	Residual	99.395	108	.920		
	Total	191.842	110			

Coefficient of Determination

The multiple regression analysis used the coefficient of determination to observe the independent variable's influence on the dependent variable. The results in Table 6 were presented in the model summary section based on the value of R square (R^2). Table 6 shows that the R^2 value obtained is 0.482 or 48.2%.

Table 6. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.694[a]	.482	.472	.95933

Discussion

The Influence of Digital Literacy on the Students' Learning Outcomes

This study found that most students have high digital literacy, indicating they have excellent skills in utilizing the internet or social media as information material for the learning process. However, 45.9% of students have medium digital literacy. This implies they have moderate literacy in supporting the learning process. Figure 2 shows that digital literacy is categorized into two groups, specifically 46% at a medium level and 54% at a high level. Despite the high-level group being marginally larger, the 46% representation of medium-level digital literacy shows the need for many students to enhance their digital skills further. While 46% may seem smaller compared to 54%, it represents a significant portion of the student population in absolute numbers. Therefore, school

administrators must bolster digital literacy through various activities encompassing curricular and extracurricular avenues.

The t-test obtained a significance value < 0.05, signifying that digital literacy significantly influences learning outcomes. This is in line with Susilo (2019) and Lingga and Madiun (2022) that digital literacy significantly influences learning outcomes. Furthermore, Ting (2015) found that digital literacy increases students' independent learning abilities. The questionnaire indicated that students had used digital media to overcome the difficulties of school work and study difficulties. According to Siddiq et al. (2017), 21st-century students should have digital literacy, communication, collaboration, and problem-solving skills.

The results show that students can currently benefit from Information and Communication Technology (ICT), which enables tasks to be completed swiftly and effectively, independent of time and space constraints. This has also prompted a shift in learning orientation from passively receiving materials to proactively seeking them. Therefore, teachers must offer enhanced learning services, particularly from earlier generations, and teach in this digital media era (Warno, 2020).

The low teachers' ability in digital literacy has resulted in less appreciative students during classroom learning (Sudarti et al., 2022). For this reason, the role of teachers in the digital age is very important. They must have high achievement motivation in mastering ICT, so they are kept from current generations (students). Moreover, the current learning should be centered on students (student-centered learning), in which the students are actively involved to improve and develop their critical thinking, problem-solving skills, communication skills, good habits, and conceptual thinking based on the current era. Furthermore, new age literacy empowers individuals to use the internet and other ICT tools to pose important questions, seek information, critically evaluate, synthesize, and communicate with others (Leu et al., 2004).

The Influence of Vocational Information Literacy on Learning Outcomes

This study found that most students have high vocational information literacy. This signifies they have good skills in utilizing the internet or social media to increase knowledge about the environment and job prospects, supporting their work readiness. However, 18.9% of the students have moderate digital literacy. Therefore, they have sufficient vocational information literacy to support work readiness. Figure 3 shows that the vocational literacy of students exceeds their digital literacy in quantity. This shows that vocational students can be more psychologically prepared for career pursuits after graduation. It is crucial to examine this assertion to identify and examine the factors contributing to their heightened career readiness post-graduation.

The t-test obtained a significance value < 0.05, implying that digital literacy significantly influences learning outcomes. In line with this, Guggemos et al. (2022) found that vocational information literacy influences student learning outcomes. The vocational information literacy questionnaire answers indicated that most students have good work readiness. According to Li (2021), students must utilize technological developments to find information using online learning tools. These include mastering information skills and using online applications, search engines, and libraries based on proficiency in computer operations. Vocational literacy positively impacts work readiness, which is integral to career progression (Dau et al., 2019). Readiness is the state of preparedness for an event (Banjongprasert, 2017), while individual readiness refers to the preparedness to act, marking the correlation between potential and job success (Kraisuth & Panjakajornsak, 2017).

Work readiness encapsulates the preparedness to enter the workforce, propelled by internal motivation and backed by capability, knowledge, mental maturity, and comprehensive information (Pratama et al., 2018). It also involves a state of readiness fueled by physical health and psychological wellness (Sijabat, 2018). The depth of understanding, knowledge, and skills commensurate with workplace demands significantly influence work readiness (Qomariyah & Az-zahra, 2020). It is a key resource and asset for vocational graduates to adapt to work and achieve optimal results (Daud et al., 2017). Given the constantly evolving competency requirements of the workforce, often driven by market, economic, and technological changes, future workers need vocational literacy (Sony et al., 2021).

The Influence of Digital and Vocational Information Literacy on Learning Outcomes

The results showed that digital and vocational information literacy partially or simultaneously influence learning outcomes. A significant influence was seen from the coefficient of determination of 48.2%. This means that digital and vocational information literacy influence vocational students' learning outcomes by 48.2%. According to Azwar's theory, the categorization reference also obtained the same results in the moderate category. This implies that the significant influence of digital and vocational literacy on learning outcomes is small. Additionally, digital and vocational information literacy impacts students' knowledge and critical thinking skills.

Digitalization is proliferating and covers all aspects of life. Hence, education should adapt to this development (Kateryna et al., 2020). Digital literacy is in the spotlight to keep up with existing digitization (Bergson-Shilcock, 2020), especially for students as future successors and movers. Furthermore, this literacy is necessary because it affects student learning outcomes (Susanto et al., 2020). Various competencies and knowledge materials are now easily accessed via the internet, making digital literacy skills useful for self-development (Kim, 2019). Nowadays, graduates also need digital literacy to find work Coldwell-Neilson and Cooper (2019) and Falloon (2020) because many companies recruit online. This would benefit graduates with digital and vocational information literacy.

The rapidly changing dynamics of the professional world, influenced by market trends, economic shifts, and technological advancements, lead to continuously evolving competency requirements of the workforce (Sony et al., 2021). These changes necessitate the development of diverse human resource competencies across timeframes, past, present, and future (Pramudia et al., 2019). Consequently, gaining work experience in relevant fields has emerged as a crucial factor in sharpening skills and knowledge aligned with chosen disciplines, ultimately enhancing work readiness (Wiharja, 2019).

This rapidly evolving landscape brings digital literacy to the forefront. Defined as the ability to effectively and efficiently use technology to gather information for everyday life (Gilster, 1997), digital literacy streamlines work with the exponentially increasing volume of available data. Simultaneously, vocational education, which comprises various courses or skills that prepare students for their professional journeys (Sudira, 2012), is enhanced by the ready availability of vocational information via electronic media and other written sources.

Building on this foundation, developing strong literacy competencies is essential, with critical thinking emerging as a key indicator of these skills. Equally important is the guidance provided to students in accessing relevant, reliable, and accurate information sources. Therefore, work readiness is vital for vocational students advancing their careers (Dau et al., 2019). All these factors underscore the argument that digital and vocational literacy influence students' learning outcomes, both individually and collectively.

CONCLUSION

The results showed that digital and vocational information literacy partially or simultaneously influence learning outcomes. A significant influence was seen in the coefficient of determination of 48.2%. Therefore, literacy could help improve students' critical thinking skills and learning outcomes. Digital and vocational literacy significantly influence the learning outcomes of Vocational High School students in Sragen Regency. This study aligns with previous findings, which established that digital and vocational literacy impacts learning outcomes. There is a need for vocational students to master digital and vocational literacy compared to general education students. This necessity stems from the vocational students' imminent entry into a highly dynamic professional world post-graduation. This implies that students must adapt to digital media in the current technological era. Therefore, they need to hone their skills in understanding and analyzing information obtained from digital media properly. This would ensure students do not easily believe hoax news in digital and social media and improve their critical thinking skills. Students also need good vocational information literacy to improve their work readiness. Teachers are essential in improving the students' digital and vocational information literacy in the school environment. This study also advocated integrating a digital approach and industry collaboration in school learning

processes to produce graduates with robust skills, a sound understanding of industrial culture, and adaptability to the professional world.

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