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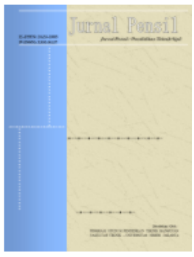

ARE VOCATIONAL SCHOOL STUDENTS READY TO FACE WORKFORCE DISRUPTION IN THE CONSTRUCTION FIELD?

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Abstract

The purpose of this research is to 1) Describe the digital literacy understanding of vocational high school students in the Construction and Property Engineering program. 2) Analyze students' understanding of technological disruption in the field of construction. 3) Analyze students' readiness to face technological disruptions in the construction field. The research was conducted at a vocational high school that offers the Construction and Property Engineering program in South Sulawesi province. The study took place from March to June 2023. The population of the research consisted of all students in grade X, totaling 1125 students. The sample size was determined using the Slovin formula with a 0.05 level of error, resulting in a sample of 318 respondents. All items are valid and reliable based on the validity and reliability test with a value greater than 0.361. The research findings indicate that the digital literacy understanding of vocational high school students in the Construction and Property Engineering program regarding their readiness to face the labor workforce disruption in the construction field is mostly categorized as very good with a percentage of 80%. Furthermore, students' understanding of technological disruption in the construction field and their readiness to face the labor workforce disruption in the construction field is dominantly categorized as very good with a percentage of 63%. Student readiness is dominantly in the Able category, but there are still 18% who are in the Need to optimize category in facing technological disruption in the construction sector.

Keywords: Digital Learning, Disruption Technology, Construction Field, Work Readiness, Vocational High School

Introduction

Vocational High Schools (SMK) are a part of the national education system that aims to produce skilled workers with abilities in line with the demands of the business/industry world. These workers should be able to develop their potential by adopting and adapting to advancements in science, technology, skills, and attitudes. (Nahriana & Arfandi, 2020; Vernanda et al., 2018). Vocational education is unique. Different from general or liberal education, the basis of vocational education is related to the main goal. Therefore, it will also be fundamentally different in terms of the ways and methods of learning, as well as the administrative institutions closely associated with the ways and methods of learning (Purnamawati, 2018; Shaidullina et al., 2014; Sudana et al., 2019).

Law Number 20 of 2003 concerning the National Education System, in the explanation of Article 15, states that "Vocational education is higher education that prepares students to have jobs with specific applied skills, up to a maximum equivalent of a bachelor's program." In this case, it is a diploma-level education and falls more under the auspices of a polytechnic. Vocational education aims to (1) meet society's need for labor; (2) increase educational options for each individual; and (3) serve as a motivational force to enhance all forms of learning (PH, 2016).

Human resources in Indonesia still need to be strengthened to have good work readiness. Lack of work readiness will result in high unemployment rates. According to a national labor force survey (Sakernas) by the Central Statistics Agency (BPS), the number of unemployed individuals in Indonesia in August 2023 is projected to reach 7.86 million out of a total workforce of 147.71 million people, around 5.32%. Unemployment is predominantly among the productive age group of 15-24 years and is commonly referred to as Generation Z (Gen Z) (Sutrisno, 2023). The presence of vocational high schools (SMK) in preparing skilled labor greatly aids the business/industry sector. However, not all SMK graduates can meet the demands of the job market. One of the reasons is the competence gap between their expertise and the needs of the job market. This is because not all SMK graduates have good work readiness. The impact can be seen in the high number of unemployed SMK graduates who have not yet found employment (Fauzi et al., 2017; Marhendi, 2021; Nugrahini, 2019).

The results of observations at State Vocational High Schools implementing the Construction Technology and Property Program in the city of Makassar and Gowa Regency show that more students are unemployed compared to those who are employed. This indicates that the students are not fully prepared for work. Many factors can influence work readiness (Baiti & Munadi, 2014; Karatas & Arpaci, 2021; Putriatama et al., 2016). Students' work readiness can be improved by collaborating with various parties such as businesses/industries, colleges, and the community to enhance their quality, for example, through conducting industrial work practices. Industrial work practice (Prakerin) is a mandatory program, especially for vocational school students (Arfandi & Sampebua, 2016; Grytnes et al., 2018; Hasbi, 2019; Remington, 2017). Data from the implementation of industrial work practices (prakerin) for students between 2017-2020 shows that many students still receive Poor grades, with an average of 15%. Therefore, industrial work practice alone is not sufficient to prepare students for work, and there is a need to encourage students to better prepare themselves for employment.

Another factor that may be related to students' work readiness is their work attitude. Attitude can be understood through one's knowledge, beliefs, feelings, and behavioral tendencies towards an attitude object. Work attitude can influence a company's goal achievement; therefore, work attitude can affect job performance in carrying out tasks (Gunawan & Mudayana, 2016). Vocational school students are expected to have a positive work attitude. When working, they should be able to make significant contributions to the outcomes and quality of their work. Referring to the Indonesian National Qualifications Framework (KKNI), SMK graduates are at levels 2 and 3 if they have at least 1 year of work experience. In the construction sector, there are 19 National Occupational Competency Standards (SKKNI) available for SMK graduates. Students' understanding of these job positions is crucial as it serves as a foundation for shaping

their attitudes in preparing themselves for work (Herlambang et al., 2013; Sutrisna & Rozak, 2023; Tauhid et al., 2022).

Subjects in Vocational High Schools are divided into three groups: normative subjects, adaptive subjects, and productive subjects. Productive subjects are a group of subjects that equip students with competencies for work according to the Indonesian National Work Competency Standards (SKKNI) (Azizah et al., 2019; Isnantyo et al., 2024; Sutikno, 2014). Productive programs are taught specifically according to the needs of each expertise program. The achievements of students in productive subjects indicate the level of knowledge and attitudes they possess in productive/vocational subjects. Through the achievements in productive subjects, it can be determined to what extent vocational programs can be mastered by students. Students who excel in vocational subjects will have high vocational abilities, and vice versa (Herlambang et al., 2013; Lispiyatmini & Hermanto, 2022).

One of the competencies in Vocational High Schools (SMK) is Design Modeling and Building Information. The curriculum followed is based on the 2013 Curriculum. According to the Regulation of the Director-General of Elementary and Secondary Education of the Ministry of Education and Culture No. 07/D.D5/KK/2018, there are three groups of subjects in the SMK curriculum: (1) Group A (National Content) includes subjects such as Religious Education and Ethics, Pancasila and Citizenship Education, Indonesian Language, Mathematics, Indonesian History, and English; (2) Group B (Regional Content) includes subjects like Cultural Arts and Physical Education, Sports, and Health Education; (3) Group C (Vocational Specialization) consists of C1 (Basic Vocational Field) subjects like Simulation and Digital Communication, Physics, and Chemistry, C2 (Basic Program Competencies) subjects like Technical Drawing, Engineering Mechanics, Fundamentals of Construction and Land Surveying, C3 (Vocational Competencies) subjects like Software Applications and Interior Design, Road and Bridge Construction, Construction Cost Estimation, Building Construction and Utilities, and Creative Products and Entrepreneurship (Asrib & Arfandi, 2020).

Currently, Curriculum Merdeka has been implemented for Vocational High School (VHS) in Indonesia. The VHS curriculum structure is divided into 2 (two), namely Intra-curricular Learning and the Project for Strengthening the Pancasila Student Profile. Intra-curricular learning at VHS is divided into 2 (two), namely general and vocational subject groups. The general subject groups are Science, English, Mathematics and Informatics Projects. Vocational subject groups, namely Basic Vocational Subjects, Creative and Entrepreneurship Subjects, and Elective Subjects (Kementerian Pendidikan dan Kebudayaan, 2024).

The challenges of the fourth industrial revolution include: (1) industry readiness; (2) dependable workforce; (3) ease of social and cultural regulation; and (4) diversification and creation of job opportunities and industrial 4.0 prospects include: (1) ecosystem innovation; (2) competitive industrial bases; (3) investment in technology; and (4) integration of Small and Medium Enterprises (SMEs) and entrepreneurship (Lekan et al., 2022; Stăncioiu, 2017; Sudana et al., 2019; Sudira, 2020). Mapping the challenges and opportunities of Industry 4.0 to prevent various impacts on society, one of which is the issue of unemployment. The Work Employment and Social Outlook Trend predicts that the global number of unemployed individuals in 2018 was estimated to reach 204 million, with an additional increase of 2.7 million. Similar to the situation experienced in Western countries, Indonesia is also predicted to face similar circumstances. Unemployment remains a challenge and is even becoming a threat. (Horne, 2023; Oviyanti, 2016).

Work readiness is a condition of harmony between physical, and mental maturity and experience so that individuals can carry out certain activities in connection with work. (Amalia & Murniawaty, 2020; Arfandi & Sampebua, 2016; Fitriyanto, 2006). Work readiness is a good physical and mental ability. Work readiness is also the overall condition of a person that makes him ready to respond/answer in a certain way to a situation (Ariyanto & Suparmin, 2014; Norwich et al., 2018).

Based on the description above, the research problem is 1) what is the understanding of students in digital literacy in the construction and property engineering skills program?; 2) what is the understanding of students in technological disruption among vocational school students in the construction and property engineering skills program?; and 3) How students' readiness to face technological disruption in the construction sector?

Research Methodology

This research is quantitative descriptive. This research was conducted at vocational schools that organize the Technology of Construction and Property Skills Program in the province of South Sulawesi. This research was conducted in March-June 2023. The population of this research is class XII students with a total of 1125 respondents. Determining the sample size used the Slovin formula with a correlation coefficient of 5%. The total sample was 318 respondents. The variables of this research are: understanding digital literacy, understanding technological disruption in the construction sector, and students' readiness to face technological disruption in the construction sector. The data collection technique uses a questionnaire distributed using Google Forms. The digital literacy understanding instrument consists of 18 statements, the instrument for understanding technological disruption in the construction sector consists of 13 statements and the student readiness instrument consists of 15 statements. All items are valid and reliable based on the validity and reliability test with a value greater than 0.361. Data analysis techniques use descriptive statistics and cross-tabulation.

Research Results and Discussion

Digital Literacy

An understanding of digital literacy for vocational school students was obtained from the percentage scores of questionnaires that were distributed with the following figure 1.

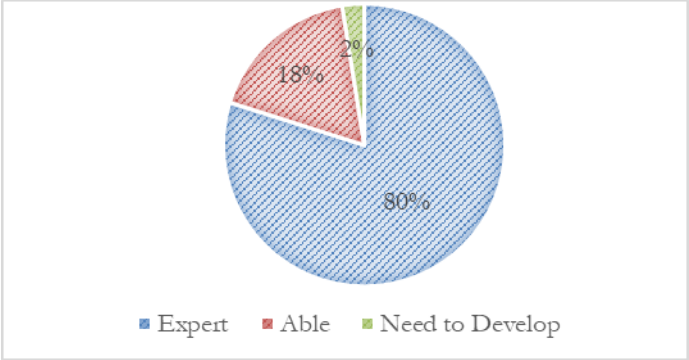

Figure 1. Students understanding of digital literacy

The results of data analysis show that the understanding of digital literacy of vocational school students in the construction engineering and property skills program obtained an average of 80% in the expert category, 18% in the able category, and 2% in the need to develop category. The results of this analysis show that vocational school students' understanding of digital literacy is in the very good category, where vocational school students' literacy understanding plays an 80% role in stimulating attitudes towards digital innovation and work behavior after graduation.

Digital skills development occurs when digital literacy is applied: creation, production and development with digital tools. Students' understanding of literacy is expected to be able to support students in self-development (Adams Becker et al., 2017; McDougall et al., 2018). Digital literacy should not only be limited to skills in using digital sources more positively, but digital literacy should also be emphasized in a way of thinking about things. Spires et al. (2019) and Tour (2017)

revealed that aspects of the research subjects' views regarding digital literacy showed that students had good abilities in communicating in the era of technological disruption. This can be seen from the average score of students in using technology in communication which is in the capable category in each question item from the questionnaire results (Spires et al., 2019; Tour, 2017). The role of using Information and Communication Technology (ICT) will help administration and communication processes. (Aditya et al., 2022). The most important thing to do to understand digital literacy is to increase control over the use of existing technology (Tinmaz et al., 2022; Vandela & Sugiarto, 2021).

Furthermore, to see more about the characteristics of the respondents, a cross-tabulation test was carried out to find out how much influence digital literacy has on students' work readiness in facing technological disruption in the construction sector. From the results of the cross-tabulation test, it can be seen how much influence digital literacy has on students' work readiness in facing technological disruption in the construction sector.

Table 1. Crosstab understanding of digital literacy and student readiness

			Student Readiness			Total
			Not Ready	Less Ready	Ready	
Digital Literation	Need to Develop	Count	5	2	1	8
		Expected Count	1.5	4.4	2.2	8.0
	Able	Count	18	33	5	56
		Expected Count	10.2	30.5	15.3	56.0
	Expert	Count	35	138	81	254
		Expected Count	46.3	138.2	69.5	254.0
Total		Count	58	173	87	318
		Expected Count	58.0	173.0	87.0	318.0

Based on the results of the crosstab test, it is known that 5 respondents said they were not ready for the digital literacy understanding indicator in the Need to Develop category, 2 respondents said they were not ready, and 1 respondent said they were ready. In the Able category, 18 respondents said they were not ready, 33 respondents said they were not ready, and 5 respondents said they were ready. Meanwhile, in the Expert category, 58 respondents said they were not ready, 173 respondents said they were not ready, and 87 respondents said they were ready.

Students' ability to communicate using technology and according to targets becomes the supporting capacity of personnel skills to improve performance. The technological era creates new needs for cooperation and collaboration such as being able to work in teams, communication skills, and networking skills. The ability to conduct personal conversations on social media and use electronic mail (e-mail) as student capital in readiness for work today (Alfa, 2018; Rahmah, 2015).

Technological Disruption in the Construction Sector

An understanding of technological disruption in construction and property engineering expertise programs was obtained from the percentage scores of questionnaires that had been distributed with the following figure 2.

The results of data analysis show that an understanding of technological disruption in the construction sector has an average of 63% in the Expert category, 32% in the Able category, and 5% in the Need to Develop category. The results of this analysis show that students' understanding of technological disruption in the construction sector regarding work readiness in facing Workforce Disruption in the Construction Sector is in a good category, where the data on understanding technological disruption of vocational school students plays a role as big as that of the expert category, 63% in their future work behavior readiness after graduation.

Munjiat & Rifa (2023) and Turner et al. (2020) explained that disruption is a situation that provides an opportunity or challenge by utilizing technological factors, the era of disruption is

marked by automation, efficiency, and innovation. The contribution of technology to changes in various areas of life is very large, as is the case with technology in the Industrial Revolution 4.0 era. Technology disruption can be described as the use of tools, equipment, machines, crafts, techniques, methodologies, and systems to solve problems or provide better ways to achieve a task (Lekan et al., 2022).

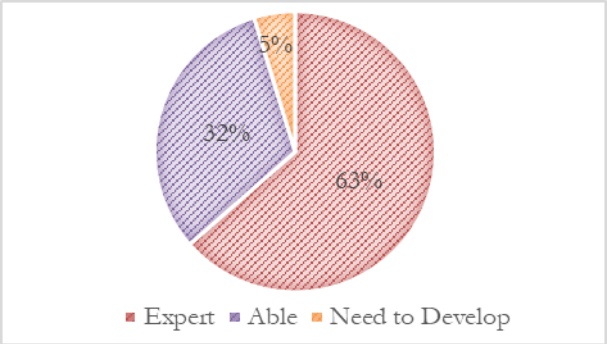

Figure 2. Students' understanding of technological disruption

Next, to see more about the characteristics of the respondents, a cross-tabulation test (crosstab) was carried out to find out how big the influence of technological disruption was on students' work readiness. From the results of the cross-tabulation test, it can be seen how much influence digital literacy has on students' work readiness in facing technological disruption in the construction sector.

Table 2. Crosstab understanding of disruption technology and student readiness

			Student Readiness			Total
			Not Ready	Less Ready	Ready	
Digital Literation	Need to Develop	Count	11	4	0	15
		Expected Count	2.7	8.2	4.1	15.0
	Able	Count	22	66	13	101
		Expected Count	18.4	54.9	27.6	101.0
	Expert	Count	25	103	74	202
		Expected Count	36.8	109.9	55.3	202.0
Total		Count	58	173	87	318
		Expected Count	58.0	173.0	87.0	318.0

Based on the results of the crosstab test, it is known that 11 respondents said they were not ready for the indicator of understanding technological disruption in the need to develop category, 4 respondents said they were not ready, and 0 respondents said they were ready. In the able category, 22 respondents said they were not ready, 66 respondents said they were not ready, and 13 respondents said they were ready. Meanwhile, in the expert category, 58 respondents said they were not ready, 173 respondents said they were not ready, and 87 respondents said they were ready.

The responses obtained from students in facing disruption show a positive relationship between understanding technological disruption in the construction sector with the work readiness in facing disruption in the construction workforce. The very good response from students towards the ability to understand the disruption that occurs in the world of construction can be believed to be the ability of students to provide wider opportunities in utilizing increasingly developing technology (Aditya et al., 2022; Turner et al., 2020).

Students' Readiness to Face Technological Disruption in the Construction Sector

Students' readiness to face technological disruption in the construction and property engineering skills program was obtained from the percentage scores of the questionnaire that had been distributed with the following figure 3.

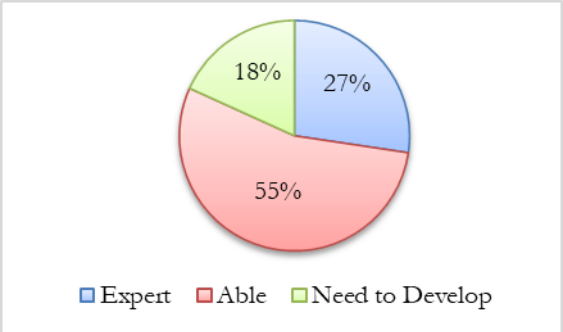

Figure 3. Students' readiness to face technological disruption in the construction sector

The results of the data analysis show that students who were ready to face technological disruption in the construction sector obtained an average of 27% in the expert category, 55% in the able category, and 18% in the need to develop category. The results of this analysis show that students' readiness to face technological disruption in the construction sector is in the good category with data on students' readiness to face technological disruption in the construction sector only playing a role in the expert category at 27%.

The development of digital technology has triggered various kinds of innovation and massive changes in the realm of business and industry. Technological developments in the current digital era can be analogous to a double-edged sword (Jones & Pimdee, 2017; Pilav-Velić et al., 2021). Where on one side it has a good impact in the form of convenience for humans On the other hand, it has negative impacts in the form of large-scale changes if not anticipated properly (Buhalis et al., 2023; Chen & Schulz, 2016).

Based on data analysis of research results on students' readiness to face technological disruption in the construction sector, it indicates that Construction and Property Technology Vocational School students as a whole are quite good but not yet optimal in their readiness to face the era of technological disruption, so attention is needed to design interesting, technology-based learning so that students are ready. fully in facing technological disruption in the construction sector (Putra et al., 2021; Tuenpusa et al., 2022).

Conclusion

Based on the results of the research and discussion, the following conclusions can be drawn; 1) Vocational school students' understanding of digital literacy is predominantly in the expert category at 80%. Thus, it can be concluded that students' understanding of digital literacy is very good, which can equip them to compete in the world of work. 2) Understanding of technological disruption in the construction sector is dominant in the Expert category at 63%. This shows that students' understanding of technological disruption in the construction sector is very good. It means most of them are ready to face Disruption of the Construction Workforce. 3) Students' readiness to face technological disruption in the construction sector is dominantly in the Capable category, at 55% but there are still 18% categories that still need to be developed. This shows that students still need to strengthen their readiness to face technological disruption in the construction sector. Teachers need to design interesting technology-based learning so that they can provide a positive stimulus to students facing technological disruption in the construction sector.

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