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The influence of covid-19 on industrial work practices of building engineering students in vocational school

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ABSTRACT

This research was conducted to determine the magnitude of the influence of COVID-19 on the implementation of Industrial Work Practices for Building Engineering students of SMKN 1 West Sumatra. This research includes quantitative research of associative approaches. The population of this study was students of class XI Building Engineering, which numbered 50 students. Data collection is carried out using questionnaires. Questionnaires are used to measure COVID-19 variables and Industrial Work Practices. Instrument testing was carried out at SMKN 1 West Sumatra in class XI students of the Mechatronics Expertise Program, totaling 30 students. The data analysis techniques used are the prerequisite analysis tests, namely the normality test and linearity test, and the hypothesis test used is a simple regression analysis. The results of the research showed that there was a positive and significant influence of COVID-19 on the implementation of Industrial Work Practices for Building Engineering Students of SMKN 1 West Sumatra. This research indicates possible changes in building engineering education methods and emphasizes the importance of flexible skills in response to changing industrial work practices.



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Introduction

Pre-employment implementation is no longer carried out as usual. This is because the world is facing a new pandemic troubling society. This pandemic initially appeared at the end of 2019, referred to as COVID-19. COVID-19, caused by SARS-CoV-2, is a new type of virus from the coronavirus (a group of viruses that infect the respiratory system). Coronavirus infection can cause mild to moderate respiration infections, such as the flu, or inflammation of the respiration system and lungs, such as pneumonia. The COVID-19 pandemic entered Indonesia in early 2020. COVID-19 has caused disruption of daily activities, one of which is learning activities at school. The school closures applied at all levels, from elementary to graduate, and were quickly replicated in a number of countries (Jung et al, 2020). This has made the education system in Indonesia change during the COVID-19 pandemic. This unprecedented circumstance has garnered global attention since it is the first instance in human history when governments have implemented policies to close schools in order to mitigate the spread of a pandemic (Viner et al., 2020). To reduce the spread of COVID-19 and learning activities can run as usual. So the government made several efforts, one of which was implementing teaching and learning activities through an online or online system.

Vocational High School (SMK) is a vocational secondary education level that aims to develop students' skills to carry out learning types and is intended to prepare students to be ready to enter the world of work (Edi, 2016). Based on this matter, it can be concluded that vocational high schools are educational institutions that provide vocational learning by delivering stimulation in the form of learning experiences and interactions with the outside world of students who are ready to enter the world of work. The application of education in Vocational High Schools (SMK) is applied with the learning-by-doing method, which is spread through Industrial Work Practices (Prakerin). Prakerin is on-the-job training that is carried out to shape the labor skills needed by a particular job. Prakerin is a form of preparation that can spur knowledge formation, experience, or knowledge transfer. This training directly lowers students related to their respective job descriptions under supervision and guidance (Sastrohadiwiryo in Mahendra et al., 2022).

The purpose of pre-employment is to produce graduates with skills and work disciplines that are by the demands of the world of work. Graduates will have good competence if the pre-employment is carried out correctly. This is because when students carry out pre-employment, they face conditions for a job in a work environment. SMK graduates are not only equipped with basic knowledge about the industrial world but also directly with experience and practical abilities in the real world of work. Therefore, educational institutions must be able to cooperate with the industrial world. The implementation of pre-employment is part of dual system education, an innovation in the SMK program where students carry out work practices (internships) in companies or industries, which are an integral part of the education and training process at SMK. Dual System Education (PSG) was inspired by two systems (dual systems) carried out in Germany. It began to be implemented in Indonesia based on the SMK curriculum in 1994, sharpened with the 1999 edition of the SMK curriculum, and emphasized with the 2004 edition of the SMK curriculum.

The critical role of Industrial Work Practice (Prakerin) or Field Work Practice (PKL) in PSG is to increase competence according to industry needs so that the needs desired by the industry are under the competencies possessed by students. The rapid advancement of DU / DI technology will be challenging in the world of education, which is generally reviewed from its equipment and competencies. There is still a gap between vocational schools and competencies in the industry. The application of parker can be seen in one of the vocational schools in West Sumatra, SMK Negeri 1 West Sumatra. Class XI students carry out the application for Prakerin at SMK Negeri 1 West Sumatra for three months, from June to September. Class XI is chosen instead of class X to do Prakerin because class XI is more mature both in skill and mentality, and psychology because students will be focused on industrial places, and each student will be separated according to the location chosen so that it is difficult for teachers or mothers and fathers to control it constantly.

The learning system through this online system has been implemented since March 2020. This online learning system is carried out face-to-face and remotely. By implementing this system, students are not required to come to school or campus to carry out the learning process. This learning system is supported by many facilities available to carry out non-face-to-face learning activities can be carried out. These distance education facilities include the google meet application, zoom meeting, google classroom, skype, youtube, and other social media applications such as WhatsApp.

With the implementation of learning with the distance education method, there is a possibility of the emergence of various kinds of problems in the course of the educational process. It is anticipated that there would be a significant number of hurdles and obstacles, particularly for students who come from homes with lower socioeconomic status (Lee, 2020; Ghosh et al., 2020; Restubog et al., 2020). With the application of non-face-to-face education, every educator and student must have a smooth internet connection so that educators and students can connect through the application facilities used. However, because there are still areas with poor internet network access, teaching, and learning activities are hampered, so the learning outcomes obtained by students are not as optimal as the learning process as usual. Likewise, the majority of Indonesian families with little financial resources who did not prioritize acquiring the necessary resources to thrive may be responsible for the majority of children's educational challenges at home. This is a prevalent occurrence in several regions of Indonesia. It is desirable for all parties involved to make addressing this educational disparity among Indonesian students a matter of national importance (Putra et al., 2020; Saidek & Islami, 2016; Muttaqin, 2018).

At this time, the problem is that due to the COVID-19 outbreak, all pre-employment activities cannot be carried out as in previous years, which has resulted in losses to class XI school students who should be able to carry out pre-employment. This pre-employment should give these students helpful experience and knowledge and make these students ready to face the world of work later. Students who do not undergo pre-employment as usual will not get the understanding that students gained in the previous year, nor will they get the valuable learning that will be achieved during pre-employment, such as the experience of interacting with employees, experience using tools and strengthening skills, and adjustment of work situations. Owusu-Fordjour et al. (2020) conducted a study to examine the influence of the corona virus transmission on the academic performance of

Ghanaian students. The researchers found that the primary reason for low learning success was the poor learning outcomes of students in some schools and universities.

Prior research, exemplified by the work of Brown et al. (2020) on the educational environment within the pandemic, establishes a foundation for investigating the ways in which institutions and students adjust to novel situations. Based on the results of an interview conducted with one of the Building Engineering teachers of SMK N 1 West Sumatra, it can be seen that students have difficulty in choosing a place to carry out pre-employment due to restrictions from schools as a result of COVID-19 which is still ongoing. The problem is not only due to restrictions from schools. Many industries have rejected preschool students and limited the number to fewer than previous years. The time for pre-employment implementation is also shortened to minimize the possibility of being affected by COVID-19; this creates obstacles for students, which results in the performance of pre-employment could be better so that the prekerin goals are achieved optimally.

Method

Based on the problems studied, the research method used is a quantitative research method associative approach. Quantitative research is a scientific method that uses numbers, starting from data collection, interpretation of data, and its results in its analysis (Arikunto in Yetra & Hakim, 2022). Associative research aims to determine the influence or relationship between or more variables. This study aims to determine the connection n between 2 or more variables (Sugiyono, 2015). The population of this study is engineering students of SMKN 1 West Sumatra, with a total population of 50 students. According to Arikunto in Ashal (2020), if the number of respondents is less than 100, then the sample is all taken, and the research is population research. In this study, because the total population is less than 100, namely 50 students, it will not be sampled, but the people will be studied.

This out using the questionnaire method. Meanwhile, the data collection tool uses a list of statements in the questionnaire. Therefore, this questionnaire contains a report that reveals the effect of COVID-19 on class XI Building Engineering parker. Using a Likert scale consisting of five alternative answers (Sugiyono, 2016). At the same time, the Likert scale has very positive and negative levels. The data obtained will later be processed and analyzed with descriptive statistical calculations using the SPSS statistical 22 programs. The illustrative statistical estimation will get the average price, mode, range, maximum value, frequency, and histogram. Furthermore, the prerequisite analysis tests are the normality, linearity, and hypothesis tests, namely simple regression analysis, coefficient of determination, and t-test.

Results and Discussions

The description of the data submitted in this study is the influence of COVID-19 on building engineering students in class XI SMK N 1 West Sumatra. The study was conducted at SMK N 4 Pariaman. The results of the study were analyzed using the help of Microsoft Office Excel 2016 and SPSS statistics 22 to find the average value of a(Mean), the median value of (Median), the value of (Mode), the minimum value (minimum), the maximum value (maximum), and the standard deviation (Standard Deviation).

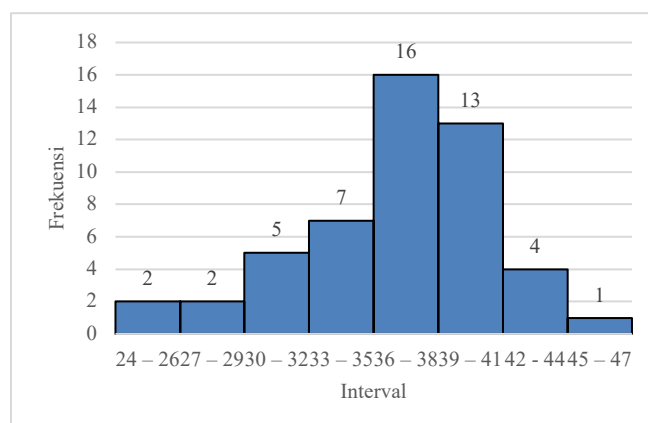


Figure 1. Covid-19 variable frequency distribution histogram

**Data Description
Covid-19****Table 1.** Statistical Calculation of COVID-19 Indicators

No	Valid	Missing	500
Mean			36.50
Median			37
Mode			37
Std. Deviation			4.756
Minimum			24
Maximum			47

The results of table 1 show an average value (mean) of 36.50, and the middle value (median) was obtained. 37, the value that often appears (mode) is 37, the minimum value (minimum) is 24, the maximum value is 47, and the standard deviation is 4,756. The result class interval is calculated by the formula Sturges Rule which is $1 + 3.3 \log n$, $1 + 3.3 \log 50 = 8$. Class range = maximum score – minimum score = $47 - 24 = 23$. Interval class length = class range/the number of interval class lengths = $23/8 = 2.87$ rounded to 3. The distribution of the variable frequency of COVID-19 is seen in table 2 below:

Table 2. Variable frequency distribution of COVID-19

No.	Interval	Frequency	Percentage
1.	24 – 26	2	4%
2.	27 – 29	2	4%
3.	30 – 32	5	10%
4.	33 – 35	7	14%
5.	36 – 38	16	32%
6.	39 – 41	13	26%
7.	42 – 44	4	8%
8.	45 – 47	1	2%
Sum		50	100%

Industrial Work Practices**Table 3.** Statistical Calculation Indicators of industrial work practice

N	Valid	Missing	500
Mean			95.18
Median			98
Mode			98
Std. Deviation			13.103
Minimum			56
Maximum			125

From the results of table 3, the average number (mean) is 95.18, the middle number (median) is 98, the number (mode) is 98, the minimum number (minimum) is 56, the maximum number is 125, and the standard deviation is 13.103. The result class interval is calculated by the formula Sturges Rule which is $1 + 3.3 \log n$, $1 + 3.3 \log 50 = 8$. Class range (range) = maximum score – minimum score = $125 - 56 = 69$. Interval class length = class range/the number of interval class lengths = $69/8 = 8.62$ rounded to 9. The frequency distribution of pre-employment variables can be seen in table 4 below:

Table 4. Prakerin variable frequency distribution

No.	Interval	Frequency	Percentage
1.	56–64	2	4%
2.	65–73	1	2%
3.	74–82	6	12%
4.	83 – 91	4	8%
5.	92–100	22	44%
6.	101-109	10	20%
7.	110-118	4	8%
8.	119-127	1	2%
Sum		50	100%

Based on the frequency distribution data above, the frequency distribution of Industrial Work Practices can be used as follows:

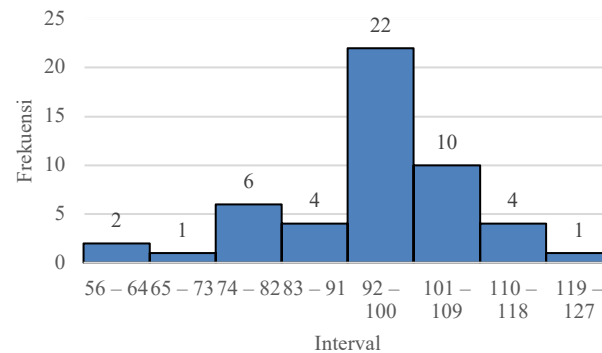


Figure 2. Histogram of Prekerin Variable Frequency Distribution

Hypothesis Testing

Hypothesis testing in this study was carried out using simple regression techniques. The hypothesis in this study is "COVID-19 has a significant effect on the implementation of industrial work practices for Building Engineering students of SMK N 1 West Sumatra". The results of a simple regression analysis can be seen in table 7 below.

Table 7. Summary of Simple Regression Analysis Results

Model	Coefficients			t	Itself.
	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta		
1 (Constant)	60.106	9.887		6.079	.000
COVID19	1.009	.267	.499	3.771	.000

a. Dependent Variable: PRAKERIN

The table above displays the regression equation $Y = 1.009 X + 60.106$. From the equation, it can be seen that the constant value has a positive regression coefficient of 60.106, indicating that if other variables have increased by 1 point, the Industrial Work Practice variable has increased by 60.106. The simple linear regression test of the regression coefficient on variable X, namely COVID-19, has a positive sign of 1,009, meaning that with every 1-point increase in COVID-19, its effect on the implementation of Industrial Work Practices has increased by 1,009. Furthermore, a coefficient of determination test and a t-test were carried out. The results of the test can be seen in table 8 below.

Table 8. Summary Of The Results Of The Coefficient Of Determination Test And The T-Test

Variable	Price r		r^2	Price t		Factor.	Art.
	count	table		count	table		
X-Y	0,499	0,235	0,249	3,771	1,677	1,009	60,106

The table above shows that the value of the regression coefficient (r_{xy}) is 0.499, and the result of the coefficient of determination (r^2_{xy}) is 0.249. The value of r^2_{xy} can be interpreted to mean that 24.9% of changes in the Industrial Work Practice variable (Y) can be explained by the COVID-19 variable (X). In comparison, 75.1% is explained by other variables not analyzed in this study. The results of the t-test obtained a t count of 3.771, while the table with $dk = (n-2 = 48)$ at a significance level of 5% is 1.677. Thus, the calculation is greater than the table ($3,771 > 1,677$), so COVID-19 (X) has a significant effect on Industrial Work Practices (Y).

Conclusions

On the basis of the findings obtained from the analysis of the questionnaire data, one may reach the conclusion that COVID-19 has a positive and substantial influence on the process of putting Industrial Work Practices into effect. That COVID-19 has an impact on 24.9% of industrial work practices, whereas the remaining 75.1% of practices are impacted by other factors that are not covered in this study.

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