The Effect of Completeness of Facilities on the Learning Outcome in Lathe Practice of the Students of Vocational High Schools in Kebumen Regency

Sarwi Asri[1], Andri Setiyawan[1] and Ayub Budhi Anggoro[1]
[1]*Faculty of Engineering, Semarang State University, Semarang, Indonesia*
{sarwiasri, andrisetiyawan, anggoroayub}@mail.unnes.ac.id

Keywords: Completeness of facilities, learning outcome, lathe practice

Abstract: The research aims to reveal the effect of completeness of facilities on the learning outcome in lathe practice of the students of vocational high school in Kebumen Regency. The research was ex-post facto research. The subjects were all of XI grade students of vocational high schools at machining competencies, totalling 1,035 students. The data were collected using a questionnaire with Likert scale and through documentation. The data were analyzed using the regression analysis. The research reveals a finding there is significant effect of the completeness of facilities on the students' learning outcome in lathe practice, at the significance level of $0.000 \leq 0.05$ and the contribution of 32.37%.

1 INTRODUCTION

According to Billet (2011: 200) that vocational education is closely aligned to the supply of labour and the kinds of labour possesses. Vocational education is closely related to the fulfilment of workforce according to the type of skills it has. Vocational education is secondary education that prepares students primarily to work in certain fields. The above statement explains that the purpose of vocational education is to produce workers who are competent in certain fields.

Vocational high school is one form of school that equipped with workshop and laboratory practices. Therefore the practice activities in vocational schools are inseparable from the use of various facilities and infrastructure to support learning activities. Referring to the purpose of vocational high school to create graduates who are able to meet the needs of middle-level workforce in accordance with their competencies, then vocational schools must be able to provide practical facilities that are in accordance with the competencies to be achieved.

Vocational education will be efficient if the student learning environment is a replica of the actual workplace. Vocational education will be effective if given using the same methods, tools, and machines needed in the job. Brown (1979: 17) states that laboratory facilities for vocational-technical services must provide the best possible match with industrial equipment, materials, work practices, and standards. The statement explains that workshop facilities in Vocational Schools such as equipment, materials, practice work, and the standards used must be in accordance with the industrial environment. Laboratory facilities that are in accordance with the industrial environment have the goal that students are accustomed to working with the actual work situation

Brown (1979: 24) states there are three fundamental planning areas of facilities: a physical plant, equipment selection, and equipment organization. There are three main aspects in facility planning in vocational education, namely physical building, equipment selection, and equipment management. Meeting the needs of vocational education facilities in Indonesia is contained in Ministerial Regulation of Education (Permendiknas) Number 40 of 2008 concerning standards for facilities and infrastructures of vocational high school and Madrasah Aliyah vocational high school which contain minimum standards of facilities and infrastructure that must be met by each department in vocational school. Each vocational school should

meet the minimum standards set so that learning activities can be carried out properly.

Government Regulation (Peraturan Pemerintah) Number 19 of 2005 concerning education national standard article 42 states that every education unit must have facilities that include furniture, educational equipment, educational media, books and other learning resources, consumables, and other equipment needed to support the learning process. regular and continuous. Then it also stated that each education unit must have infrastructure which includes land, classrooms, leadership units, education rooms, administration rooms, library rooms, laboratory rooms, workshops, production units, canteens, power installations and services. , a place to exercise, a place of worship, a place to play, a place of creation, and other spaces or places needed to support a regular and continuous learning process.

From the description above we can conclude that every education unit must have the facilities and infrastructure needed to support a regular and continuous learning process. So that the fulfilment of the complete facilities and infrastructure will have a positive impact on the success of students in obtaining sufficient information, knowledge, and skills as an effort to prepare themselves in order to enter jobs in accordance with the demands required.

The results of research conducted by Setiadi (2008: 83) said that there is an influence between learning facilities and infrastructure on student learning outcomes. Therefore, meeting the needs of good workshop facilities must be sought to improve students understanding in practical activities. The results of a survey conducted at the research location schools showed that there was an imbalance between the building area of the workshop and the number of equipment and machinery facilities with the number of students. The number of tools and machines is limited so that in the use of students must queue or even be used together in large groups. One way to overcome the limitations of the number of machines available is that the school applies morning and afternoon study hours.

The survey data shows that the number of workshop facilities is not ideal with the number of students. Therefore some schools apply morning and afternoon study hours to deal with the limitations of the number of machines available such as those carried out at Kutawinangun 1 Development Vocational School and Nawa Bhakti Kebumen Vocational School. However, different things are shown by Wongsorejo Gombong Vocational High School which has special facilities for each class so that practice activities become more intensive.

Completeness of facilities in a workshop must be supported by the management of the facilities and infrastructure itself. An understanding of workshop management and leadership management from teachers and technicians is very important as part of the workshop manager. Brown (1979: 273) a number of significant administrative tasks, however, are related to the operation of instructional programs and laboratories. These tasks should be well understood by industrialists because it who will perform.

2 METHODS

This research was included in the ex-post facto study, because in the study there was no treatment or manipulation of the research variables, but revealed facts based on the measurement of the symptoms that had occurred in the previous respondent. This study aims to reveal the events that occurred and then trace back to find out the factors that caused the incident.

This ex-post facto study belongs to a type of correlational study because this study aims to find out about the strength or weakness of the influence of the variables involved in the object or subject under study. This research is quantitative, where the symptoms to be examined are measured using numbers. This study allows statistical analysis techniques to be used to process data. Please follow the instructions closely in order to make the volume look as uniform as possible (Moore and Lopes, 1999).

2.1 RESEARCH DESIGN

The design and purpose of the study must be determined before conducting a study. It is intended that the results of the study be in accordance with the direction and purpose of the study as previously determined. The design in this study was ex-post facto. Step analysis by conducting prerequisite test analysis and hypothesis testing. Analysis prerequisite tests include normality test, linearity test, and multicollinearity test. Hypothesis testing using regression analysis was carried out after the analysis prerequisite test was fulfilled. The purpose of hypothesis testing using regression analysis is to determine the magnitude of the influence of the

completeness of facilities on the learning outcome of lathe practice of SMK students in Kebumen Regency.

The step in this regression analysis is determine the regression line equation with the following predictor regression line equation:

$Y = a + b1X1$

information:

Y = criterium
X1 = predictor
a = constant number
b1 = predictor coefficient 1

Search the multiple correlation coefficients of independent variables on the dependent variable. Multiple correlation coefficients are used to calculate the coefficient of determination in order to know the size of the contribution value of the independent variable to the dependent variable. The formula is as follows $KP = R^2 \times 100\%$.

The discussion of the results of research for conclusions was carried out after the multiple regression analysis steps were passed. This research displays variables as they are, without setting conditions or manipulating variables. This study focuses on finding information that can explain the existence of complex phenomena through causal relationships between variables.

2.2 RESEARCH SAMPLES

The population in this study were all of XI grade students of vocational high schools at machining competencies, totalling 1,035 students of Mechanical Engineering Competence in Vocational Schools throughout Kebumen Regency. The population is large enough so that sampling is needed. Proportional Random Sampling or random sampling was used in this study. This sampling method is use because of the population is considered homogeneous, the all students is in the same level and also study program.

The determination of the number of samples by using empirical formula tables by Isaac and Michael. From the empirical formula table by Isaac and Michael (Sukardi, 2003: 56), it is known that the number of samples for population of 1,035 students does not exist. Therefore, the researcher took a sample for the available population, that is in the population of 1,100. From the table it is known that the number of samples for a population of 1,100 students is 285 students for the error level of 5%. Furthermore, sampling technic for each school was using proportional random sampling.

The variables in this study consist of dependent variable and independent variable. The dependent variable signed Y variable and the independent variable signed X variable. The variables in this study can be described as follows:

The dependent variable (Y) in this study is the learning outcome of student lathe practices. The independent variable (X) in this study is completeness of facility.

2.3 INSTRUMENTS AND DATA COLLECTING TECHNIQUE

2.3.1 Data Analysis Technique

The data from each variable are presented in the form of data descriptions. The data analysis shown of smallest and largest data, the range of data, the mean, the median, the mode, the frequency distribution table, the histogram and the tendency table for each variable. The data were processed using SPSS program.

Inferential statistics were used on this research are parametric statistics. The analysis methods that used in this research was regression analysis technique. Regression analysis is a process of systematically estimating what might happen in the future based on past and present information that is owned so that errors can be minimized. Prediction does not provide a definite answer about what will happen, but tries to find an approach to what will happen. Regression analysis is used because of the functional relationship or causal relationship (causal) of the independent variable (X) to the dependent variable (Y). Regression analysis in this study was calculated with the help of the SPSS program.

3 FINDINGS

The details of the data description for each variable can be seen in the following description.

3.1 Completeness Facilities

Data on completeness of facilities in the Mechanical Engineering Department of the vocational education in Kebumen Regency was obtained through a closed questionnaire consisting of 79 items of statements for 285 respondents. After analysis, it was found that the maximum value of the facilities in the Engineering Department of the Kebumen Vocational School was 58 and the minimum value was 33. Based on the calculation, the mean value was

48.1825, mode (Mo) was 45.00, median (Me) was 48 and standard deviation was 4.80409.

Table 1. Data from Descriptive Analysis of Variables in Workshop Facilities.

Statistics		
Completeness of Facilities		
N	Valid	285
	Missing	0
Mean		48.1825
Median		48.0000
Mode		45.00
Std. Deviation		4.80409
Variance		23.079
Range		25.00
Minimum		33.00
Maximum		58.00

The data obtained needs to be determined by the number of interval classes to make it easier to tabulate. The method used to determine the number of interval classes is the formula K = 1 + 3.3 log n, so that the mathematical equation K = 1 + 3.3 log 285 = 9.1 is rounded to 9, whereas to determine the length of the class by looking for a range of data first, namely by reducing the maximum score with a minimum score then plus 1, RD = (maximum - minimum) + 1 = (58 - 33) + 1 = 26. The length of the class can be searched by means of the data divided by the number of classes interval = RD: K = 26: 9 = 2.89 rounded to 3.

Table 2. Variable Data Frequency Distribution of Facilities

No	Score	Frequency		
		Absolute	Relative (%)	Cumulative
1	33 - 35	3	1.0526315	1.0526315
2	36 - 38	8	2.8070175	3.8596491
3	39 - 41	11	3.8596491	7.7192982
4	42 - 44	28	9.8245614	17.543859
5	45 - 47	80	28.070175	45.614035
6	48 - 50	62	21.754385	67.368421
7	51 - 53	53	18.596491	85.964912
8	54 - 56	32	11.228070	97.192982
9	57 - 59	8	2.8070175	100

The image below shown a frequency histogram of variable completeness workshop facilities in the Machining Department of SMK in Kebumen Regency.

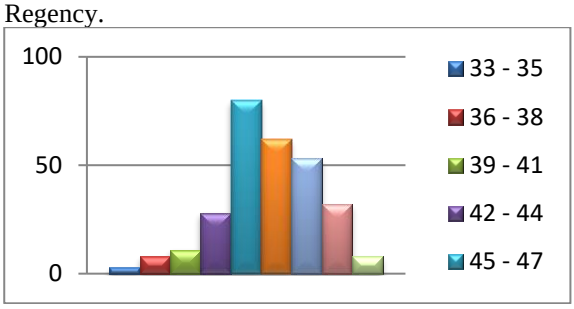

Figure 1. Histogram of Completeness Facilities in the Machining Department of SMK in Kebumen Regency

Based on the frequency histogram of the completeness facilities in the Machining Department of Vocational Schools throughout Kebumen Regency above the highest number of frequencies were in the interval class 45 - 47, which was as many as 80 respondents.

This research is included in the type of ex-post facto type of correlational study because this study aims to find out about the strength or weakness of the influence of the variables related to the object or subject under study. While the contribution of independent variables to the dependent variable both jointly and individually is a follow-up, if it is proven that there is a significant relationship between the independent variable and the dependent variable. Before testing hypotheses with the analytical techniques used, there are requirements that must be met, including the distribution of scores must be normal and the relationship of independent variables with the dependent variable is a linear relationship.

The normality test is done to find out whether the data on each variable is normally distributed or not. If the data of each variable is normally distributed, the correlation analysis produced is not a distribution problem, so the analysis is accurate. A summary of the results of the calculation of the normality test can be seen in Table 27.

Table 3. The Summary of Normality Test

No.	Variables	Kolmogorov Smirnov	p	Conclusion
1.	Completeness of Facilities (X)	1,324	0,060	Normal
2.	Learning Outcome (Y)	1,185	0,143	Normal

Based on the results of the normality test, it can be concluded that the variable completeness of facilities and learning outcome of lathe practices have a normally distributed data. This is evidenced by the probability value of all variables having a p value> p critical (0.05) so that the data is said to be normally distributed.

Linearity test is intended to find out the pattern of the relationship between each independent variable with the dependent variable whether it is linear or not. Decision making for this linearity test by consulting the probability value p count with p critical (0.05). If the value of p count > p critical, then the relationship pattern of each variable is linear. On the contrary if p count < p critical, then the relationship pattern of each variable is not linear. A summary of the results of the calculation of the linearity test can be seen in Table 4.

Table 4. The Summary of Linearity Test Results

No.	Variables	p count	p critical	Conclusion
1.	X to Y	1,361	0,130	Linier

Based on the results of the linearity test on the table it can be concluded that the relationship between the independent variable and the dependent variable has a linear relationship. This is because the value of p count > p critical. The requirement to do a regression analysis is that the data are normally distributed and the pattern of linear relationship. Based on the analysis prerequisite test above, it is known that the data is normally distributed and has a linear relationship pattern so that the requirements of the regression analysis have been fulfilled.

3.2 Hypothesis Test Results

The hypothesis is a temporary answer to the problem statement. Therefore the hypothesis must be tested for empirical truth. Testing the hypothesis in this study concerning whether or not the influence of the independent variable on the dependent variable. Simple regression analysis techniques was use to testing the hypotheses.

The null hypothesis (Ho) proposed in this study is:

There is no significant effect of the completeness of the facilities on the learning outcome of the practice of lathe of SMK students in Kebumen Regency.

With the holding of hypothesis testing it will be known whether the proposed hypothesis has been accepted or rejected. Explanation of the results of hypothesis testing in this study are as follows

The Hypothesis Test influences the completeness of the facilities on the learning outcome of the practice of lathe of SMK students in Kebumen Regency.

Testing the first hypothesis use regression analysis with the help of SPSS 16 program. Decision making is done by looking at the significance value of the t-test. Ha acceptance guide is if the significance value is t-test ≤ 0.05.

Table 5. Results of Variable T-Test Complete Facilities (X) on Lathe Practice Learning Outcome (Y)

No.	Variables	t-test	t-test significance	Conclusion
1.	X on Y	6,938	0,0000	Ha is accepted

Based on these results the significance value below 0.05 was in the rejection area of Ho. Therefore, it can be concluded that Ho is rejected while Ha is accepted, namely there is a significant effect of the completeness of the facility on the learning outcome of lathe practices. The conclusion of this hypothesis is proven to be true where the significance is 0,000 ≤ 0,05.

4 DISCUSSION

The results of regression analysis obtained the regression line equation Y = 29,861 + 0,546 X. This means that the facilities are increased by 1 point, the lathe practice learning outcome will increase by 0.546 points. The meaning of the results of the regression analysis shows that the higher the completeness of the facilities, the better the learning outcome of lathe practices. This means that there is a significant effect of the completeness of the facility on the learning outcome of lathe practices.

The size of the contribution of the facility is indicated by the calculation of the coefficient of determination (R^2). From the results of the analysis it is known that the (R^2) value is 0.323761. This means that the variable completeness of the facilities contributed to the increase in learning outcome of students' lathe practices by 32.37% and the remaining 67.63% was influenced by other variables. Therefore, the school is better to complete the facilities because the completeness of the facilities will have a significant influence on improving student learning outcome.

This is in line with the statement of Young, et. al, (2003: 9-12) which are some of the effects of the facilities completeness factors conducted from

several studies which explain that the condition of facilities, temperature, lighting, colour, environment, air quality, and noise in the workshop can improve learning outcomes.

Completeness of facilities has significant influence on learning outcome. This happens because the practice will be able to run optimally in accordance with the learning objectives if it is balanced with the completeness of adequate workshop facilities. This condition allows students to improve their ability. The competencies possessed by a student are expected to be able to complete the given worksheet with satisfactory results, therefore the need for continuous learning patterns that can shape students' abilities naturally in accordance with conditions in the workplace.

Vocational stakeholders in Kebumen Regency must have a high level of awareness if they want to succeed in educating and teaching competence to their students. Complete facilities will help students to achieve established work standards. With the proof that complete facilities can improve student learning outcome in turning significantly, the school is required to take steps that are able to improve the completeness of existing facilities in each school. Such as the application of a single machine system for two students so that it allows all students to follow the practice effectively without students who cannot participate in the practice to complete the worksheets provided by the teacher.

5 CONCLUSION

Based on the results and discussion of the research the conclusions that can be put forward in this study is:

There is a significant effect of the completeness of the facilities on the learning outcome of the practice of lathe of SMK students in Kebumen Regency as evidenced by the significance value of 0,000 ≤ 0.05 and the contribution of completeness of facilities to the student learning outcome is 32.37%.

REFERENCES

Billett, Stephen. (2011). *Vocational Education: Purposes, Traditions and Prospects*. New York: Springer.

Brown, R.D. (1979). *Industrial education facilities: a handbook for organization and management*. Boston: Allyn and Bacon.

Mendiknas. (2008). *Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 40, Tahun 2008, tentang Standar Sarana dan Prasarana Sekolah Menengah Kejuruan/Madrasah Aliyah Kejuruan (SMK / MAK).*

Moore, R., Lopes, J., (1999). Paper templates. In *TEMPLATE'06, 1st International Conference on Template Production*. SCITEPRESS.

Presiden. (2005). *Peraturan Pemerintah Nomor 19, Tahun 2005, tentang Standar Nasional Pendidikan.*

Setiadi. (2008). Pengaruh sarana dan Prasarana Belajar tehadap Hasil Belajar Mata Pelajaran Alat Ukur. *Jurnal Pendidikan Teknik Mesin*, 8 (2), 83-86.

Smith, J., 1998. *The book (2nd edition)*. London: The publishing company.

Sukardi. (2010). *Metodelogi Penelitian Pendidikan*. Jakarta: Bumi Aksara.

Young, Ed et al. (2003). *Do K-12 School Facilities Affect Education Outcomes?* Nashville, Tennessee: Tacir Publication.