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Experimental Study on the Management of Motorcycle Engineering Practice Workshops at SMKN 2 Pangkal Pinang and SMKN 1 Simpangkatis in Relation to Student Academic Achievement

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ABSTRACT: The purpose of this study is to analyze the factors involved in managing practical workshops, including workshop space management, equipment management, and occupational health and safety (K3), in relation to student achievement in motorcycle engineering workshops at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis. This research is an ex-post facto study using a correlational approach. The population consists of all 11th-grade students at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis, totaling 120 students. The sample size, calculated using the Slovin formula with a 10% margin of error, resulted in 72 respondents. Data collection was carried out through questionnaires and tests, supported by Google Forms. The prerequisites for this research involved tests for normality, linearity, and multicollinearity. Hypotheses were tested using simple and multiple regression analyses. The results showed that workshop space management has a positive and significant impact on student achievement. Likewise, equipment management and K3 were found to have a positive and significant influence on student achievement. Overall, workshop management positively and significantly affects student performance at both SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis

KEYWORDS: Workshop Space Management, Workshop Equipment Management, Occupational Health and Safety (K3), and Learning Outcomes

I. INTRODUCTION

Education is a process through which an individual can change their attitudes and behaviors to develop social and individual skills in line with the advancement of knowledge and technology. Law No. 20 of 2003 defines education as: "A conscious and planned effort to create a learning environment and learning process so that students actively develop their potential to acquire spiritual strength, self-control, personality, intelligence, noble character, and the skills they need for themselves, society, the nation, and the state."

Education is the foundation of a nation's development and plays a crucial role in improving human resources. A country that aims for social development must focus on improving the quality of its education system. It is essential to use education as a benchmark for enhancing a nation's human resources (HR). One of the key factors contributing to the development of a better society and nation is education. Developed nations have excellent education systems, allowing them to produce highquality human resources for future generations.

Education has evolved in various forms, both formal and informal, with the goal of developing human potential. Vocational education, or Sekolah Menengah Kejuruan (SMK) in Indonesia, is one such system designed to cultivate human potential. Vocational education aims to produce productive individuals who are capable of working and contributing to society without becoming a burden on their families, communities, or nations (Soenaryo et al., 2002:17).

Vocational education continues to develop in various schools, both formal and informal, with the objective of nurturing human potential. As noted by Clarke & Winch (2007:9), “Vocational education is confined to preparing young people and adults for working life, a process often regarded as of rather technical and practical nature.”

Another perspective on vocational training comes from Murniati and Nasir (2009:2), who state that vocational education provides students with the knowledge, skills, and experiences necessary to perform specific jobs, which are crucial for personal, professional, and national development.

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Education in Indonesia is still far from expectations, as evidenced by the many complex issues in the education sector. The growing complexity of these problems is compounded by the perception that the government's attention is still inadequate. Despite being central to the national education system, Law No. 20 of 2003 on the National Education System states that the National Education System must ensure equal access to education, improve quality, and enhance relevance and efficiency. Education management must be tailored to local and national needs to address the changing demands of global life.

Issues in education include poor student performance, lack of teacher knowledge, high school fees, and more. The question remains: how can we create high-quality human resources (HR) when education quality is still low, teachers are underqualified, the cost of education is relatively expensive, and the curriculum does not meet expectations? If education quality remains poor, how can we produce high-quality human resources?

A pressing problem in national education, particularly vocational education, is the large number of SMK graduates whose skills fall short of the standards required by businesses and industries. Vocational education aims to produce graduates who are trained and ready to work (ready to use). Dewi Fitriani (2022) noted that with the global demands brought by the ASEAN Free Trade Area (AFTA) and ASEAN Free Labour Area (AFLA), the need for education has become increasingly complex. The education sector must produce skilled workers who can adapt and survive in the global landscape.

Therefore, the research problem to be addressed in this study is to determine and analyze the extent to which factors such as workshop space management, workshop facility management, and occupational health and safety (K3) influence the academic performance of SMK students. The purpose of this study is to assess the impact of these factors on the learning outcomes of SMK students today.

II. METHOD

This study is an ex post facto research, as described by Kerlinger (1993), where empirical observations are made systematically without the researcher controlling the independent variables, as they exist naturally or cannot be significantly manipulated (Soti S. and Rajendra K., 2007: 314). According to Sukardi (2003:15), ex post facto research is a type of correlational study because its purpose is to understand the strengths or weaknesses of variables that are related to one another. Based on its level of explanation, this research is classified as associative, aimed at identifying relationships between variables. It employs a quantitative approach, where the data collected can be measured using numerical values, allowing for statistical analysis.

This study was conducted from February to March 2024 at two different schools: SMK Negeri 2 Pangkalpinang and SMK Negeri 1 Simpangkatis, focusing on the Motorcycle Engineering Program in the Province of Bangka Belitung Islands. The population consisted of all students in these programs at the two schools. The sampling method used is cluster sampling (subsampling), as the sample size is large. Cluster sampling involves selecting samples based on groups, regions, or naturally occurring target groups rather than individuals (Sukardi, 2003: 61). The sample size used for this study is 120 students or respondents.

In testing the hypothesis, the research utilized normality and linearity tests. After these initial tests, further hypothesis testing or pre-assumption tests were conducted. Regression analysis was employed to assess the impact of factors such as workshop space management, material and equipment management, maintenance and repair of tools/machines, and overall management on student performance.

III. RESULT AND DISCUSSION

A. RESULT

a. Normality Test

The data collected was then subjected to a normality test to determine whether the data is normally distributed. Normally distributed data exhibit a normal curve, meaning that the sample data can represent the tested population. The normality test in this study used the Kolmogorov-Smirnov test with the help of SPSS (Statistical Package for the Social Sciences) Version 16. Based on the results of the normality test, the significance value (sig.) obtained was 0.968, which is greater than 0.05. Therefore, it can be concluded that the data tested is normally distributed. **b. Linearity Test**

In addition to the normality test, a linearity test was performed to determine whether each independent variable has a significant linear relationship with the dependent variable. The linearity test was conducted using SPSS Version 16, and the presentation of the linearity test data was based on the analysis results at each school. The overall linearity test data was also performed. The table below presents the results of the linearity test for the data at SMK N 1 Simpang Katis.

Table 1. Linearity Test for the Data at SMKN 1 Simpang Katis

No	Variable	Significance level	Conclusion
1	X1 towards Y	0,252 > 0,05	Linear
2	X2 towards Y	0,812 > 0,05	Linear
3	X3 towards Y	0.163 > 0,05	Linear

Based on the linearity test table for data obtained at **SMK N 1 Simpang Katis**, as shown in Table 17, the results are as follows: The first linearity test between the variable Workshop Space Management (X1) and Student Achievement (Y) showed a significance level of 0.252, which is greater than 0.05, indicating a linear relationship. The second linearity test, examining the relationship between Workshop Facility Management (X2) and Student Achievement (Y), resulted in a significance level of 0.812, also greater than 0.05, demonstrating a linear relationship. The third linearity test between Occupational Health and Safety (K3) (X3) and Student Achievement (Y) yielded a significance level of 0.163, again greater than 0.05, confirming a linear relationship. Overall, the linearity test results for data from SMK N 1 Simpang Katis show that all independent variables have a linear relationship with the dependent variable. Additionally, the results of the linearity test at SMK N 2 Pangkal Pinang are presented in the table below.

Table 2. Linearity Test for the Data at SMK N 2 Pangkal Pinang

No	Variable	Significance level	Conclusion
1	X1 towards Y	0,319 > 0,05	Linear
2	X2 towards Y	0,348 > 0,05	Linear
3	X3 towards Y	0.504 > 0,05	Linear

Based on the linearity test table for data obtained at **SMK N 2 Pangkal Pinang**, as presented in Table 18, the results are as follows: The first linearity test between the variable Workshop Space Management (X1) and Student Achievement (Y) showed a significance level of 0.319, which is greater than 0.05, indicating a linear relationship. The second linearity test, examining the relationship between Workshop Facility Management (X2) and Student Achievement (Y), resulted in a significance level of 0.348, also greater than 0.05, demonstrating a linear relationship. The third linearity test between Occupational Health and Safety (K3) (X3) and Student Achievement (Y) yielded a significance level of 0.504, again greater than 0.05, confirming a linear relationship. Overall, the linearity test results for data from SMK N 2 Pangkal Pinang show that all independent variables have a linear relationship with the dependent variable. Based on the data from each school where linearity tests were conducted, it can be concluded that the data is linear and suitable for hypothesis testing. To provide a comprehensive conclusion, a general linearity test was performed across all data, and the results for both schools are presented in the table below.

Table 3. Overall Linearity Test

No	Variable	Significance level	Conclusion
1	X1 towards Y	0,254 > 0,05	Linear
2	X2 towards Y	0,833 > 0,05	Linear
3	X3 towards Y	0.083 > 0,05	Linear

Based on the overall linearity test table from the two schools included in the study, the results are as follows: The first linearity test between the variable Workshop Space Management (X1) and Student Achievement (Y) showed a significance level of 0.254, which is greater than 0.05, indicating a linear relationship. The second linearity test, examining the relationship between Workshop Facility Management (X2) and Student Achievement (Y), resulted in a significance level of 0.833, also greater than 0.05, demonstrating a linear relationship. The third linearity test between Occupational Health and Safety (K3) (X3) and Student Achievement (Y) yielded a significance level of 0.083, again greater than 0.05, confirming a linear relationship. Overall, the linearity test results indicate that all independent variables have a linear relationship with the dependent variable..

c. Multicollinearity Test

The multicollinearity test is conducted to determine if there is a correlation among the independent variables in the dataset. This test is performed by calculating tolerance and the Variance Inflation Factor (VIF). The multicollinearity test uses SPSS (Statistical Package for the Social Sciences) Version 16. The results from this test can be seen in the following table:

Table 4. Results of the Multicollinearity Test

No	Variable	Collinearity Statistics		Conclusion
		Tolerance	VIF	
SM K N 1 Simpang Katis				
1	X1	.634	1.578	No Multicollinearity Detected
2	X2	.960	1.042	No Multicollinearity Detected
3	X3	.613	1.630	No Multicollinearity Detected
SMK N 2 Pangka Pinang				
1	X1	.785	1.274	No Multicollinearity Detected
2	X2	.798	1.253	No Multicollinearity Detected
3	X3	.970	1.031	No Multicollinearity Detected

Based on the multicollinearity test results presented in Table 4, the findings for SMK N 1 Simpang Katis and SMK N 2 Pangkal Pinang are as follows:

At SMK N 1 Simpang Katis, the test for multicollinearity revealed that the tolerance value for the management of practice space (X1) was 0.634, which is greater than 0.10, and the Variance Inflation Factor (VIF) was 1.578, which is less than 10. These results indicate that there is no multicollinearity for this variable. Similarly, for workshop facility management (X2), the tolerance value was 0.960, and the VIF was 1.042, both suggesting no multicollinearity. The Occupational Health and Safety (K3) variable (X3) also showed a tolerance value of 0.613 and a VIF of 1.630, indicating no multicollinearity.

At SMK N 2 Pangkal Pinang, the multicollinearity test results showed that the tolerance for the management of practice space (X1) was 0.785, and the VIF was 1.274, both indicating no multicollinearity. For workshop facility management (X2), the tolerance was 0.798 and the VIF was 1.253, suggesting no multicollinearity. The K3 variable (X3) had a tolerance value of 0.970 and a VIF of 1.031, also indicating no multicollinearity.

Overall, the multicollinearity tests for both schools show that there is no significant multicollinearity among the variables. Therefore, the data meets the necessary criteria for conducting hypothesis testing using simple and multiple regression analyses. .

1. Hypothesis Test

In this study, hypothesis testing is conducted to verify whether the preliminary assumptions formulated at the beginning are supported by empirical data. There are four hypotheses in this research. Specifically, hypotheses one through three are tested using simple linear regression analysis, while hypotheses one through six are examined using multiple regression analysis. Each hypothesis is discussed as follows:

Table 5. T-test results

Model		standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38.321	13.822		10.007	.000
	Management of Practice Space	.29	.135	.026	.218	.028
2	Workshop Facility Management	.604	.056	.786	10.873	.000
3	K3	.615	.097	.597	6.354	.000

Based on the analysis of the hypotheses, the results obtained are as follows:

For the influence of practice space management on student achievement, the T-Test results show a constant value of 55.634. This indicates that the baseline value for the practice space management variable is 55.634. Additionally, the regression coefficient for the practice space management variable is 0.604. This result means that for every 1% increase in the practice space management variable, the participant's achievement score will increase by 0.29. Since the regression coefficient is positive, it can be concluded that the direction of the influence between practice space management and student achievement is positive. The significance value

for this result is 0.00, which is less than 0.05. Therefore, it can be concluded that there is an effect of practice space management (X1) on student achievement (Y).

Next, for the effect of workshop facility management on student achievement, the T-Test results reveal a constant value of 55.634, indicating the baseline value for the workshop facility management variable. The regression coefficient for the workshop facility management variable is 0.604, which means that a 1% increase in workshop facility management leads to a 0.29 increase in the participant's achievement score. This positive regression coefficient suggests a positive influence between workshop facility management and student achievement. The significance value is 0.00, which is less than 0.05, indicating a significant effect of workshop facility management (X2) on student achievement (Y).

Finally, for the effect of K3 (occupational health and safety) on student achievement, the T-Test results show a constant value of 56.475. This indicates the baseline value for the K3 variable. The regression coefficient for K3 is 0.615, meaning that each 1% increase in K3 leads to a 0.615 increase in student achievement scores. Since this regression coefficient is positive, the influence of K3 on student achievement is also positive. The significance value for this result is 0.000, which is less than 0.05. Therefore, it can be concluded that there is a significant effect of K3 (X3) on student achievement (Y).

Table 6. Results of the Relativity Test

SE %	Value
X1	25,5
X2	13,9
X3	4,7
R Square	44,1

Based on the calculations using SPSS software and supported by Excel, the results of the relativity test, presented in Table 26, are as follows: The relative contribution of the variable **Practice Space Management (X1)** to student achievement (Y) is 25.5%. The relative contribution of **Workshop Facility Management (X2)** to student achievement (Y) is 13.9%. The relative contribution of **Occupational Health and Safety (K3) (X3)** to student achievement (Y) is 4.7%. Together, the combined relative contributions of X1, X2, and X3 to Y amount to 44.1%.

Table 7. Results of the Effectiveness Test Calculation

SR %	Value
X1	57,9
X2	31,5
X3	10,6
R Square	100

The results of the effectiveness test for each variable used in the research are presented in Table 27 and can be interpreted as follows: the effectiveness level of the management of practical space on student performance is 57.9%, the effectiveness contribution of workshop facility management on student performance is 31.5%, and the effectiveness contribution of K3 (occupational health and safety) on student performance is 10.6%. Therefore, it can be concluded that, based on the data presented, the management of practical space, workshop facility management, and K3 collectively contribute 100% effectively to student performance.

DISCUSSION

1. The Effect of Practical Space Management on Student Performance

The analysis of data using simple regression between practical space management and student performance, with a significance level of 5%, yielded a significant value of 0.028 < 0.05. The regression coefficient obtained was 0.29, indicating a positive coefficient. Therefore, the analysis concludes that there is a significant positive effect of practical space management on student performance at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis.

Based on the data analysis, it can be concluded that practical space management positively affects and can enhance student performance. Field findings also indicate that practical learning proceeds smoothly, effectively, and according to plan, supported by good practical space management. Interviews with several students revealed that they feel comfortable and can concentrate on practical learning. Factors contributing to this include the proximity of the workshop to the classroom, well-organized layout,

windows and doors designed according to industry conditions for easy access, controlled air pollution, clean and comfortable laboratory space, well-organized storage, and complete supporting facilities, all of which positively impact student performance.

2. The Effect of Workshop Facility Management on Student Performance

The data analysis using simple regression between workshop facility management and student performance, with a significance level of 5%, produced a significant value of 0.000 < 0.05. The regression coefficient obtained was 0.604, indicating a positive coefficient. Therefore, the analysis concludes that there is a significant positive effect of workshop facility management on student performance at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis.

Based on the analysis and interviews with teachers at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis, it is revealed that workshop facility management affects student performance. Good facility management supports practical student performance, including aspects such as well-prepared equipment usage guidelines, organized storage, equipment maintenance and repair, and a well-maintained physical environment, which collectively contribute to improved student performance.

3. The Effect of Occupational Health and Safety (K3) Implementation on Student Performance

The analysis using simple regression between K3 implementation and student performance, with a significance level of 5%, yielded a significant value of 0.000 < 0.05. The regression coefficient obtained was 0.615, indicating a positive coefficient. Therefore, the analysis concludes that there is a positive effect of K3 implementation on student performance at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis. The analysis and interviews with several teachers at the vocational schools indicate a positive effect of K3 (Occupational Health and Safety) implementation on student performance. Although the implementation of K3 in each school still requires improvement, from the teachers' evaluations, it is clear that there are consistent points emphasizing K3. This focus suggests that students who perform well will certainly pay attention to K3 practices. From these findings, it can be concluded that the effect of K3 implementation extends beyond workplace safety to positively impact student performance as well.

1. The Effect of Workshop Management on Student Performance

The analysis using multiple regression, which includes variables such as practical space management, workshop facility management, and K3 implementation, yielded a significance level of 5% with a significant value of 0.000 < 0.05. This indicates that there is a positive effect of practical space management, workshop facility management, and K3 implementation on student performance at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis.

Overall, the variables of workshop management in this study—comprising practical space management, workshop facility management, and K3 implementation—affect student performance. Each of these variables contributes to student performance. Despite this, interviews revealed that many aspects of implementation still need improvement to further enhance student performance.

IV. CONCLUSION

Based on the data analysis conducted in the study titled "The Impact of Workshop Management on Student Performance in Practice: A Case Study of Motorcycle Practice Workshops at SMK N 2 Pangkal Pinang and SMK N 1 Simpang Katis," the following conclusions can be drawn:

1. There is a positive and significant impact of practical space management on student performance in practice. This was demonstrated through hypothesis testing with data from SMK N 1 Simpang Katis (significance value 0.000 < 0.05) and SMK N 2 Pangkal Pinang (significance value 0.000 < 0.05), with a relative contribution of 25.5% of practical space management on student performance.
2. There is a positive and significant impact of workshop facility management on student performance in practice. This was shown by hypothesis testing with data from SMK N 1 Simpang Katis (significance value 0.000 < 0.05) and SMK N 2 Pangkal Pinang (significance value 0.000 < 0.05), with a relative contribution of 13.9% of workshop facility management on student performance.
3. There is a positive and significant impact of K3 (Occupational Health and Safety) implementation on student performance in practice. This was evidenced by hypothesis testing with data from SMK N 1 Simpang Katis (significance value 0.000 < 0.05) and SMK N 2 Pangkal Pinang (significance value 0.008 < 0.05), with a relative contribution of 4.7% of K3 on student performance.
4. There is a positive and significant impact of practical space management, workshop facility management, and K3 on student performance in practice. This was demonstrated by hypothesis testing with data from SMK N 1 Simpang Katis (significance value 0.044 < 0.05) and SMK N 2 Pangkal Pinang (significance value 0.026 < 0.05), with a combined relative contribution of 44.1% of practical space management, workshop facility management, and K3 on student performance.

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