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# The Relationship Between Workshop Facilities and Infrastructure with School Students' Learning Outcomes in Lathe Machining Engineering Subjects

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## Abstract

Workshop facilities and infrastructure need to be considered to improve student skills. This study aims to determine the relationship between workshop facilities and infrastructure with the learning outcomes of lathe machining techniques class XI at SMK Negeri 5 Padang. This type of research is quantitative correlational research. The sampling technique used a total sampling of 60 students who were sampled. Data obtained through distributing questionnaires and learning outcomes data obtained from practical learning outcomes in the 2022/2023 school year, the data analysis technique is a product-moment correlation. Product moment correlation analysis shows a positive relationship between workshop infrastructure facilities and learning outcomes in lathe engineering courses taken by class XI students at SMK Negeri 5 Padang. Therefore, it can be said that workshop facilities and infrastructure support well, giving students a better opportunity to obtain good learning outcomes than in schools where workshop facilities and infrastructure do not support them.

**Keywords:** Relationships, Infrastructure of Workshops, Learning Outcomes, Vocational Schools

## Introduction

Education is a lifelong effort to nurture human personality and potential inside and outside the class (Siregar et al., 2022; Subakti et al., 2022; Utami et al., 2022). According to the fourth paragraph of the 1945 Constitution, "Educating the Life of the Nation," the goal is to advance national development through formal and informal education because it is the most effective means to obtain and answer development needs. Aspects of human resource potential must thus be prioritized in the national education system strategy through improving education, and the quality of human resources can be enhanced (Baro'ah, 2020; Warisno, 2019). Several variables affect how well students are educated in school, including those related to students, teachers, the learning process, the surrounding environment, the learning environment, and time (Bagus et al., 2023).

Two categories of elements impact student learning success/displacement, namely, internal factors and external factors (Prasetya et al., 2021). Internal variables are variables experienced by learners personally. External factors, on the other hand, are elements unrelated to the individual. Learning infrastructure and facilities (external variables) and internal considerations affect student learning outcomes (Fortuna et al., 2022).

Vocational high schools (SMK) offer formal education to build competent human resources to enter the world of work (Fajar & Hartanto, 2019; Wahyuni et al., 2022). Education as theory and practice are two philosophies in vocational high schools (Vahlefi et al., 2023). Education theory is a collection of logically arranged insights. It has the function of describing, conveying, observing, and organizing the occurrence of educational symptoms based on practical experience and reflection of thoughts on what education means in a broader context (Fortuna et al., 2023; Prasetya et al., 2023). However, education requires many actions to be observed or

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realized to support students in changing their behavior. Workshop facilities are critical to successful practice processes and learning outcomes (Mei & Gayatri, 2023). Facilities known as "workshops" help implement the teaching and learning process (Basatha et al., 2021).

The basic principle is that workshop facilities are the key to the success of the learning process in SMK, an educational level (Hidayat et al., 2022; Wachidia, 2019). Most of the workshop facilities here are neglected, resulting in inadequate equipment. Many tools today have been used for too long, which contributes to the deterioration of workshop facilities, as does the indiscriminate use of these tools, making them vulnerable to damage and less efficient. According to the results of initial pre-observations conducted in July-December 2021 on students of SMK Negeri 5 Padang, based on the observations of researchers showed that the learning outcomes of Mechanical Engineering students in the Lathe Mechanical Engineering subject and its facilities and infrastructure had several problems, among others, because there were still many students' test scores that had not reached the minimum completeness criteria (KKM) set by the school. The available data shows that many students have test scores in Lathe Machining Engineering subjects under KKM or have not been completed due to inadequate lathe equipment. It can also be seen from the results of students' practical work that is not precise because students are not careful at the time of practice, and the facilities and infrastructure in the workshop are inadequate so that the workpiece does not match the worksheet (job sheet) that has already been determined. The next problem is that the facilities and infrastructure faced are only three lathes that can be used for 30 students in one class, thus making students use one machine for five people alternately, lathe equipment is lacking and inadequate, narrow classrooms and rooms are also joined by milling machining classes, thus making students unable to learn practice optimally and can produce many students' incomplete grades.

Therefore, inadequate facilities and infrastructure will complicate learning activities and affect students' high and low learning outcomes. Because basically, how the learning process goes will affect how learning outcomes. The existence of facilities and infrastructure is related to students' learning outcomes because if the facilities and infrastructure are inadequate, the teaching and learning process in the classroom will also experience obstacles and is not optimal in learning. Based on the explanation above, researchers are interested in researching the relationship between workshop facilities and infrastructure with the results of learning lathe machining techniques at SMK Negeri 5 Padang.

## Methods

### Types of Research

The type of research used in this study is quantitative correlational research. This research uses methods to test specific theories by examining the relationship between variables. These variables are usually measured with research instruments, so data consisting of numbers can be analyzed based on statistical procedures (Pakpahan et al., 2022).

### Population and Sample

The research population is all grade XI students of the SMK Negeri 5 Padang Mechanical Engineering Department, totaling 60 students in the 2022–2023 academic year. The sample methodology used in the study was the comprehensive sampling strategy. The total sampling is the entire population.

### Data Collection Technique

Many data collection procedures, including questionnaires and documentation, were used to add up the data in the research released.

### Research Instruments

In this study, the instruments used were questionnaires and documentation. Questionnaire instruments obtain information from independent variables, namely facilities, and infrastructure. Documentation is used to capture data on the physical condition of mechanical engineering workshops, workshop equipment inventory data, number of students, and schedules of learning activities. The instrument grid is the result of the theory of Barnawi and M.Arifin, 2012 and modified from the research to be carried out. The steps for preparing the instrument are as follows:

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Table 1 : Instrument Workshop Facilities and Infrastructure

| Aspect | Indicator |
|---|---|
| Workshop Room | Student Capacity |
| | Meet ratio requirements Minimum land area for students |
| Furniture in the workshop room | There is a proton that supports workshop facilities. |
| Workshop equipment | Adequate equipment available |
| Educational Media | There are media in the workshop room. |
| Completeness of workshop facilities | There are supporting facilities for learning. |
| Unit activities Production | There are unit activities in Production in the workshop. |
| Ratio Use of tools | There are unit activities in Production in the workshop. |
| Account space efficient | As required, 60% - 80% |

The scoring in this study uses a Likert scale compiled based on indicators related to learning motivation. The Likert scale system in this study is as follows:

Tabel 3: Likert scale

| Positive Questions (+) | | Negative Questions (-) | |
|---|---|---|---|
| Alternative Answers | Score | Alternative Answers | Score |
| Agree | 5 | Strongly Disagree | 1 |
| Agree | 4 | Disagree | 2 |
| Disagree, Less, | 3 | Disagree, Less, | 3 |
| Disagree | 2 | Agree | 4 |
| Strongly Disagree | 1 | Agree | 5 |

**Validity**

In testing the validity of workshop facilities and infrastructure, the author corrects each question item with data on the number of values of all question items for each variable using the Pearson product-moment correlation test, and the results are as follows:

Table 4: Validity Test Results

| No Item | r count | r table | Information |
|---|---|---|---|
| 1 | 0,661 | 0,361 | Valid |
| 2 | 0,679 | 0,361 | Valid |
| 3 | 0,509 | 0,361 | Valid |
| **4** | **0,251** | **0,361** | **No valid** |
| 5 | 0,604 | 0,361 | Valid |
| 6 | 0,583 | 0,361 | Valid |
| 7 | 0,574 | 0,361 | Valid |
| **8** | **0,278** | **0,361** | **No valid** |
| 9 | 0,708 | 0,361 | Valid |
| 10 | 0,611 | 0,361 | Valid |
| 11 | 0,614 | 0,361 | Valid |
| 12 | 0,540 | 0,361 | Valid |
| 13 | 0,510 | 0,361 | Valid |

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| | | | |
|---|---|---|---|
| 14 | 0,700 | 0,361 | Valid |
| **15** | **0,261** | **0,361** | **No valid** |
| 16 | 0,492 | 0,361 | Valid |
| 17 | 0,607 | 0,361 | Valid |
| 18 | 0,563 | 0,361 | Valid |
| 19 | 0,772 | 0,361 | Valid |
| 20 | 0,781 | 0,361 | Valid |
| 21 | 0,595 | 0,361 | Valid |
| 22 | 0,550 | 0,361 | Valid |
| **23** | **0,296** | **0,361** | **No valid** |
| 24 | 0,661 | 0,361 | Valid |
| 25 | 0,679 | 0,361 | Valid |
| 26 | 0,509 | 0,361 | Valid |
| **27** | **0,251** | **0,361** | **No valid** |
| 28 | 0,604 | 0,361 | Valid |
| 29 | 0,583 | 0,361 | Valid |
| 30 | 0,715 | 0,361 | Valid |

**Reliabilty**

In research, reliability is assessed using SPSS version 25 in calculating the value of Cronbach's Alpha on the variables studied. If Cronbach's Alpha score is more than 0.600, then the responder's answer is considered credible (Ghozali, 2009). This is the result:

Table 5: Reliability Test Results

| Cronbach's Alpha | N of Items | Cronbach's Alpha | N of Items |
|---|---|---|---|
| 0,921 | | | 30 |

## Results and Discussion

### Data Description

Two variables, namely workshop infrastructure (X) and student learning outcomes, are research data (Y). Data descriptions include facts about the amount of data, median score, mode, mode (frequent score), standard deviation, variance, range, lowest score, highest score, and total score. The following table provides details of workshop infrastructure and facilities along with student learning outcomes:

Table 6: Descriptive Research Data

| | | Facilities | Learning outcomes |
|---|---|---|---|
| N | Valid | 60 | 60 |
| | Missing | 0 | 0 |
| Mean | | 101.55 | 68.97 |
| Std. Error of Mean | | 1.122 | 1.003 |
| Median | | 102.00 | 70.00 |
| Mode | | 98 | 72 |
| Std. Deviation | | 8.693 | 7.766 |
| Variance | | 75.574 | 60.304 |
| Skewness | | -.673 | -.945 |
| Std. Error of Skewness | | .309 | .309 |
| Kurtosis | | .711 | 1.220 |
| Std. Error of Kurtosis | | .608 | .608 |
| Range | | 42 | 37 |
| Minimum | | 75 | 43 |
| Maximum | | 117 | 80 |
| Sum | | 6093 | 4138 |

### Data Analysis Results

***Normality test***

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Obtaining normality test results on each research variable.

Table 7: Normality Test

| One-Sample Kolmogorov-Smirnov Test | | | |
|---|---|---|---|
| | | Facitlites | Learning outcomes |
| N | | 60 | 60 |
| Normal Parameters[a,b] | Mean | 101.55 | 68.97 |
| | Std. Deviation | 8.693 | 7.766 |
| Most Extreme Differences | Absolute | .092 | .103 |
| | Positive | .038 | .078 |
| | Negative | -.092 | -.103 |
| Test Statistic | | .092 | .103 |
| Asymp. Sig. (2-tailed) | | .200[c,d] | .182[c] |

The significant value of workshop infrastructure is 0.200, as seen from the description of the table above, while the considerable importance of learning outcomes is 0.182. Both data in the study were normally distributed, with the significance of both data > 0.05.

***Linearity Test***

The results of the linearity test are summarized as follows:

Tabel 6: Linearity test

| ANOVA Table | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Sum of Squares | Df | Mean Square | F | Sig. |
| Learning outcomes * Facilites | Between Groups | (Combined) | 3011.467 | 30 | 100.382 | 5.327 | .000 |
| | | Linearity | 2306.759 | 1 | 2306.759 | 122.416 | .000 |
| | | Deviation from Linearity | 704.708 | 29 | 24.300 | 1.290 | .249 |
| | Within Groups | | 546.467 | 29 | 18.844 | | |
| | Total | | 3557.933 | 59 | | | |

There is a relationship between the predictor and the dependent linear variable, evidenced by the magnitude of deviations from the linearity given by sig. > 0.05. According to the investigation findings, the variable workshop facilities and infrastructure has a linearity deviation value of 0.249 > 0.05. As a result, it can be claimed that infrastructure has a direct effect on student learning outcomes.

***Test the hypothesis***

Product Moment correlation analysis from Karl Person was used to test this hypothesis.

Tabel 7: Hypothesis test

| | | Facilities | Learning Outcomes |
|---|---|---|---|
| Facilites | *Pearson Correlation* | 1 | .805** |
| | *Sig. (2-tailed)* | | .000 |
| | N | 60 | 60 |
| Learning Outcomes | *Pearson Correlation* | .805** | 1 |
| | *Sig. (2-tailed)* | .000 | |
| | N | 60 | 60 |

Table 7 shows that $r_{count}$ has a higher value than $r_{table,}$ which is 0.805 > 0.254, so Ha is accepted and has a significant deal of 0.000, offering a very substantial interweaving with the study's hypothesis in light of these findings. According to the product-moment correlation analysis results, there is a solid and good relationship between the learning outcomes of workshop infrastructure.

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### Discussion

In the class XI lathe machining method at SMK Negeri 5 Padang, this *research* reveals the relationship between workshop infrastructure and student learning outcomes. The product-moment correlation analysis found that workshop infrastructure and the results of learning lathe machining skills in class XI SMK Negeri 5 Padang have a good and significant relationship. According to the calculations in Table 7, it is clear that Ha is accepted, and there is an extensive association because the $r_{calculated}$ value is higher than the $r_{table}$ or 0.805 > 0.254. These findings support the premise of the study, which is accepted. Based on the results of *quantitative correlational* analysis, it has a strong enough relationship between workshop infrastructure facilities on the learning outcomes of class XI lathe skills of SMK Negeri 5 Padang. Thus, schools with good workshop infrastructure have a greater chance of producing relatively good learning outcomes than schools that do not have these facilities and infrastructure.

## Conclusion

The conclusions in this study are based on a review of the results and discussion above, namely: The results showed that workshop infrastructure at SMK Negeri 5 Padang had a significant and positive relationship with class XI learning outcomes in lathe learning, with $r_{count}$ 0.805 > $r_{table}$ 0.254, showing the facilities- High workshop infrastructure will have good learning outcomes and vice versa if the levels are lacking. The results of the investigation of the relationship between workshop infrastructure on the learning outcomes of grade XI students of SMK Negeri 5 Padang with a correlation coefficient of 0.805 are included in a powerful group.

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## Declaration

### Author's Contribution

Waldyansyah is a researcher and data collection and Budi Syahri is the one who directs the method and process of making.

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### Conflict interest

The authors declare no conflict of interest.

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