# The Influence of Facilities and Infrastructure in Computer Laboratories on Student Learning Outcomes at SMK

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**ABSTRACT**

Learning facilities have a very important role in supporting learning success. With the use of the right learning facilities, it is hoped that students can more easily understand the material presented. The use of appropriate learning facilities is a crucial factor in learning activities, because the learning process will run well if supported by adequate facilities. On the other hand, without good facilities and infrastructure, students will experience obstacles in learning, which can negatively impact their performance. This research was carried out at SMK N 5 Semarang. The method used in this study is quantitative based on the view of positivism, which focuses on empirical observation and hypothesis testing with a scientific approach [6-7]. This study uses a quantitative descriptive approach. The sample in this study is 36 students for XI DPIB 1, 35 students for XI DPIB 2, and 36 students for XI DPIB 3. The results of this study include instrument validation, which includes feasibility tests and trials to measure the validity and reliability of instruments in studying the impact of laboratory infrastructure on student learning outcomes. In addition, this study also involves data processing to present a description of the results of instruments that explore how computer laboratory infrastructure facilities affect student learning outcomes in class XI DPIB at SMK Negeri 5 Semarang. Based on the results of data analysis, there is an influence between computer laboratory room infrastructure facilities on the learning outcomes of grade XI students of Building Modeling Design Elements at SMK Negeri 5 Semarang in the 2023/2024 Academic Year, with the contribution of these infrastructure variables to learning outcomes of 14.9%. This study shows that computer laboratory infrastructure facilities need to continue to be optimized in the world of education.

***Keywords:*** *Facilities and Infrastructure, Computer Laboratory, Learning Outcomes*

## 1. INTRODUCTION

Facilities and infrastructure have an influence on the learning process. The following are some of the impacts, namely Comfort and Security, Learning Facilities, Technology and Access to Information, Motivation and Engagement, Skills Development to Time Management. With this impact, indirectly facilities and infrastructure will also affect learning outcomes. "Learning facilities are all that is needed in the teaching and learning process, both mobile and immobile, in order to achieve educational goals running smoothly, orderly, effectively and efficiently"[1] According to this opinion, it can be concluded that all learning facilities are needed for students to achieve learning goals through exploration and discovery activities, in order to gain an understanding of the material being studied. The standard of facilities and infrastructure at vocational schools should meet the minimum requirements stipulated in the regulations, one of which is in the regulation of the Minister of Education and Culture [2, 3, 4, 5]. In addition to being in accordance with national standards, facilities and infrastructure should also be in accordance with the needs of the learning process. In accordance with the results of previous research, the facilities and facilities at SMK N 5 Semarang are in accordance with the regulations of the Minister of Education and Culture. So in this study, the influence of facilities and infrastructure on learning outcomes in the DPIB expertise program will be seen and focus on the facilities and infrastructure of the Computer Laboratory on the elements of building modeling design elements at SMK Negeri 5 Semarang.


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## 2. METHOD

The quantitative research method is based on the view of positivism, which focuses on empirical observation and hypothesis testing with a scientific approach [6, 7]. This study uses a quantitative descriptive approach, which focuses on the collection and analysis of numerical data to provide a systematic, objective, and in-depth picture of the phenomenon being investigated. Statistical data analysis is used to describe and analyze the patterns that emerge from the data, providing a thorough understanding of the actual state observed. The analysis method chosen is a simple linear regression, which is used to evaluate how much the influence of facilities and infrastructure (variable X) on learning outcomes (variable Y). The purpose of this approach is to evaluate not only the direct impact of facilities and infrastructure on student learning outcomes, but also to measure how much these factors affect overall learning outcomes. This research was carried out at SMK Negeri 5 Semarang, which is located at Jalan Dokter Cipto No.121, Karangturi, East Semarang District, Semarang City, Central Java 50124. The participants of this study are students who are taking class XI in the Building Modeling and Information Design Expertise Program. The sampling technique is an approach to determining the size of a sample that is representative of the entire population, taking into account the characteristics and distribution of the population to ensure that the sample is representative [8]. The sample in this study is 36 students for XI DPIB 1, 35 students for XI DPIB 2, and 36 students for XI DPIB 3.

## 3. RESULT AND DISCUSSION

Facilities and infrastructure can affect the implementation of the learning process, including (1) Comfort and Safety, which is good facilities and infrastructure can create a comfortable and safe environment for students and educators. This allows for a greater focus on learning without distractions or discomfort that can interfere with concentration; (2) Learning Facilities, namely adequate facilities such as spacious classrooms, complete libraries, laboratories, and sports facilities allow students to get a more varied and rich learning experience. For example, with a good laboratory, students can conduct hands-on experiments that support the understanding of scientific concepts; (3) Technology and Information Access, which is modern facilities and infrastructure, such as fast internet access, computers, and other supporting technology devices, help students to access information more easily and quickly. This supports independent and collaborative learning; (4) Motivation and Involvement, which is an adequate means to increase student motivation to learn. For example, attractive facilities such as a well-equipped library or a clean and organized classroom can encourage students to be more active in the learning process; (5) Skills Development, namely good facilities and infrastructure, can also support the development of non-academic skills such as social skills, leadership, and collaboration. For example, a classroom designed for collaborative learning can help students learn to work together in a team, (6) Time Management which is an efficient and organized means can help in learning time management. For example, an organized schedule and easily accessible facilities allow learning to take place as planned without many interruptions. Thus, investment in educational facilities and infrastructure not only improves the quality of the learning environment [9, 10, 11], but also supports the achievement of student learning goals more effectively and efficiently.

Based on the data, the results of this study include instrument validation, which includes feasibility tests and trials to measure the validity and reliability of instruments in studying the impact of laboratory infrastructure on student learning outcomes. In addition, this study also involves data processing to present a description of the results of instruments that explore how computer laboratory infrastructure facilities affect student learning outcomes in class XI DPIB at SMK Negeri 5 Semarang.

### *3.1. Research Instrument Feasibility Test*

To find out how feasible or appropriate the instrument will be used as an instrument sheet, a feasibility test of the research instrument will be carried out first. In the feasibility test of this research instrument, the researcher asked for help from two ahl validators as instrument feasibility testers. The assessment of the feasibility test of this instrument was carried out once with 55 statements. After the data is obtained, the data will then be tabulated and interpreted using Gregory's formula to determine the rater agreement index [13]. As the results are as follows:

**Table 1.** Data on the Results of the Feasibility Test of Research Instruments

| No | Indicator | Interpretation | Category |
|---|---|---|---|
| 1 | Clarity of the title of the questionnaire/questionnaire sheet | 1 | very high |
| 2 | Clarity of Instructions for Filling Out Questionnaires/ Questionnaires | 1 | very high |
| 3 | Clarity of questionnaire/questionnaire question items | 0,9818 | very high |
| 4 | Clarity of scoring guidelines/scoring criteria | 0,9455 | very high |

| No | Indicator | Interpretation | Category |
|---|---|---|---|
| 5 | Accuracy of questions with expected answers | 1 | very high |
| 6 | The limitations of the questions and answers are appropriate | 1 | very high |
| 7 | questions according to the student's ability | 1 | very high |
| 8 | Questions related to the purpose | 1 | very high |
| 9 | questions according to the aspect to be achieved | 1 | very high |
| 10 | Revealing the correct information | 1 | very high |
| 11 | Questions according to theory/indicators | 1 | very high |
| 12 | The question contains one complete idea | 1 | very high |
| 13 | The language used is easy to understand | 1 | very high |
| 14 | Standard and effective language | 1 | very high |
| 15 | Language means one unbiased/double meaning | 1 | very high |

### *3.2. Research Instrument Trials*

The instrument test in this study was carried out on only one variable, namely the influence of computer laboratory infrastructure on student learning outcomes in the computer laboratory of the Department of Building Modeling and Information Design, SMK Negeri 5 Semarang. The instrument will be used to evaluate whether infrastructure facilities have an impact on student learning outcomes in the Department's computer laboratory. This trial involved 22 students or a randomly selected sample of respondents, using an error rate of 5% and a table r value of 0.423. Therefore, if the calculated r value exceeds the table r value of 0.423, then it can be concluded that the statement is valid. The results of the validity test of the instrument to evaluate the influence of computer laboratory infrastructure on student learning outcomes, were carried out using the SPSS (Statistical Product and Service Solutions) application by involving 22 students as a sample of respondents. This instrument consists of 67 statements, and from the results of the analysis, it was found that as many as 38 of them were proven to be valid.

### *3.3. Instrument Reliability Test*

An instrument is considered trustworthy if it provides consistent results when tested repeatedly. This study applies an external reliability test using the Cronbach's Alpha method with the help of the SPSS (Statistical Product and Service Solutions) application. The results of this test will show how much reliability the instrument is used. Based on the results obtained, the reliability value obtained is 0.945, which indicates that the instrument has a very high level of reliability. From the results of this trial, the research instrument regarding the influence of infrastructure facilities on student learning outcomes in the DPIB Department of SMK Negeri 5 Semarang showed a level of reliability with an alpha value of 0.945, which is interpreted as very strong.

### *3.4. Prerequisite Test*

Before performing a simple linear regression test on the data that has been collected in this study, a series of prerequisite tests or classical assumption tests need to be carried out first. This step aims to ensure that the regression model used produces results that are free of bias. The prerequisite tests that will be carried out include normality tests and linearity tests. In this study, the first step is a normality test which aims to ensure that the data used has a normal distribution. The data analyzed included variables of infrastructure (X) and learning outcomes (Y). The normality test will be carried out using the Kolmogorov-Smirnov technique with the Monte Carlo approach, as well as using the SPSS application with an error rate of 5%. If the significance value obtained from the Kolmogorov-Smirnov test with the Monte Carlo approach is less than 0.05, then H0 will be rejected, which means that the residual data is not normally distributed. Conversely, if the significance value is more than 0.05, then H0 will be accepted, indicating that the data have a normal distribution [14, 15]. Based on the results of statistical analysis of the normality test conducted using the Kolmogorov-Smirnov method with the Monte Carlo approach [16, 17], a significance value of 0.142 was obtained with a confidence level of 5%. These results indicate that the data is normally distributed. Then the next step is the Linearity Test in the context of this study is evaluated using the F test. A relationship between the free variable (X) and the bound variable (Y) is considered linear if the significance value (sig) > 0.05. From the results of this data processing, a significance value of 0.164 was obtained, which was greater than 0.05. This shows that the relationship between the variables of infrastructure and student learning outcomes is linear.

### *3.5. Data Descriptive Statistics*

This research is a type of explanatory research, which focuses on collecting data related to learning outcomes through recording student report cards and evaluating infrastructure using questionnaires. The respondents involved were 85 students from class XI Building Modeling and Information Design at SMKN 5 Semarang. This study identified one independent variable, namely the condition of infrastructure facilities in the computer laboratory room (X), and one dependent variable, namely the achievement of student learning outcomes (Y). Before conducting a more in-depth data analysis of the hypothesis, a descriptive statistical analysis will be carried out on data on infrastructure facilities and student learning outcomes. The variables studied include the condition of computer laboratory infrastructure as an independent variable and student learning outcomes as a dependent variable. Descriptive statistics are used to explain or provide an overview of the characteristics of a data set without drawing general conclusions [18]. In scientific research, the maximum value is the highest value of each variable tested, while the minimum value is the lowest value or the smallest value of the data analyzed in the sample. Based on the results of descriptive statistical analysis conducted using the SPSS application, the infrastructure variable (X) has a minimum value of 88, a maximum of 152, a mean of 114.88, and a standard deviation of 14.972. Meanwhile, the learning outcome variable (Y) has a minimum value of 73, a maximum of 93, a mean of 86.14, and a standard deviation of 4.181.

### *3.6. Hypothesis Testing*

This study uses statistical analysis for hypothesis tests, especially simple linear regression tests, with the aim of exploring whether there is an influence between independent variables (infrastructure) and dependent variables (student learning outcomes) [18, 19, 20]. The result of this test is a Constant of 79.574. Meanwhile, the value of Infrastructure Facilities is 0.057. Thus, a simple linear regression equation with a significance level of 5% can be determined, which can be interpreted that for every increase of 1 variable value of infrastructure facilities, the value of student learning outcomes will increase by 0.057.

Then the hypothesis proposed in this study assumes that the infrastructure in the computer laboratory room affects the learning outcomes of students in class XI Building Modeling Design Elements at SMK Negeri 5 Semarang. This hypothesis can be formulated as follows: "There is an influence between computer laboratory infrastructure facilities on the learning outcomes of grade XI students of Building Modeling Design Elements at SMK Negeri 5 Semarang for the 2023/2024 Academic Year". In hypothesis analysis, this study uses the t-test method. One of the criteria for interpreting the results of the t-test is to compare the significance value (Sig) with a probability limit of 0.05. If the Sig value < 0.05, then variable X is considered to have an effect on variable Y; on the other hand, if the Sig value > 0.05, variable X is considered to have no effect on variable Y. Based on the analysis of the results of a simple linear regression test, the regression coefficient for infrastructure facilities in the computer laboratory room was found to be 0.057. The recorded significance value (Sig) was 0.000, with a significance level of 5% (0.05), so the Sig value was 0.000 < 0.05. In addition, the calculated t-value obtained is 3.811, which is greater than the t-value of the table of 1.9889. Thus, it can be concluded that the infrastructure in the computer laboratory affects the learning outcomes of grade XI students in the Building Modeling Design Element at SMK Negeri 5 Semarang for the 2023/2024 Academic Year. These results show that the hypothesis is acceptable. In this study, the value of the determination coefficient was used which aims to measure the extent to which the regression model can explain the variation that occurs in the dependent variable. Based on the results of the determination coefficient test, the R Square value shows that the contribution of the variable of infrastructure facilities to student learning outcomes is 0.149, or equivalent to 14.9%. This shows that infrastructure, as an independent variable, has a correlation of 14.9% with the variable of student learning outcomes, which is a dependent variable. Meanwhile, 85.1% was influenced by other factors outside the infrastructure variables analyzed in this study.

## 4. CONCLUSION

Based on the discussion of the above research, it can be concluded that there is an influence between computer laboratory room infrastructure facilities on the learning outcomes of grade XI students of Building Modeling Design Elements at SMK Negeri 5 Semarang in the 2023/2024 Academic Year, with the contribution of the infrastructure variable to learning outcomes of 14.9%. This study shows that computer laboratory infrastructure facilities need to continue to be optimized in the world of education. Good and adequate facilities will provide convenience and comfort for students in the learning process, so that they can improve their learning outcomes.

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