Learning Outcomes of Class XI Students of Building Construction and Sanitation Expertise Concentration on Building Construction Cost Estimation Elements at SMK N 7 Semarang with the Application of Skill Based Learning Model Assisted by Google Classroom Media

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ABSTRACT

The background of this study began during the implementation of UNNES Lantip 3 at SMK N 7 Semarang on August 31 - November 9, 2024. The researcher taught 11th grade Building Construction, Sanitation, and Maintenance major with the subject of Construction Cost Estimation. Furthermore, the researcher explored this lesson for further research. Based on pre-research data and interviews on October 30-31, 2023, KGSP grade XI students had difficulty in understanding Construction Cost Estimation, especially the calculation of volume and material requirements and work wages. Therefore, it is necessary to apply learning models and supporting media that are in accordance with the characteristics of construction cost estimation subjects, which are close to the characteristics of the skill-based learning model and Google Classroom. The purpose of this study was to determine the learning outcomes of grade XI students in the concentration of building construction and sanitation expertise in the element of building construction cost estimation at SMK N 7 Semarang after the application of the skill-based learning model assisted by google classroom media. This type of research is quantitative research with a Quasi Experimental Design approach. The samples used in this study were class 11 KGSP 1 as a control class totaling 32 students using a conventional learning model and 11 KGSP 2 as an experimental class totaling 33 students using a skill-based learning model assisted by google classroom media. The data collection technique is with a question instrument in the form of an initial test (Pre-Test) and a final test (post-test). The validation test is using the Product Moment formula, while the data reliability test is using the Alfa Cronbach technique. Data analysis techniques used by using t-test or average difference test. The results of this study indicate that the average post-test value (74.24) is higher than the pre-test value (39.39) in the experimental class, while the control class post-test value of (45.16) is much lower than the experimental class. This is evidenced by the Paired Sample t-test hypothesis test with a significance value (2-tailed) of (0.00 <0.05), which indicates a significant difference. In addition, the Independent Sample t-test hypothesis test with a significance value (2-tailed) of (0.00 < 0.05) also showed a significant difference. From these results, it can be concluded that the application of the Skill Based Learning model assisted by Google Classroom media improves student learning outcomes and is better than the conventional learning model on building construction cost estimation elements of class XI Phase F Building Construction and Sanitation Concentration at SMK N 7 Semarang.

Keywords: *Student Learning Outcomes, Skill Based Learning Model Assisted by Google Classroom Media*

1. INTRODUCTION

According to SISDIKNAS Law no. 20 of 2003 [1]: Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by himself and society. The purpose of national education is to educate the nation's life and develop the whole Indonesian human being, namely a human being who believes and is devoted to God Almighty and has noble character, has knowledge and is able to develop his/her skills.skills, physical and spiritual health, a stable and independent personality and a sense of community and national responsibility.

The achievement of success in the world of education is greatly influenced by teachers / educators in teaching students. Teaching is the creation of an environmental system that allows the learning process to occur. In the classroom, students are often found who find it difficult to accept or capture the subject matter provided by the teacher. Teachers are less able to choose the right learning method or model for a subject matter so that sometimes students in the classroom are sleepy and bored [2].

In essence, teaching is a process where teachers and learners create a good environment for effective learning activities to occur. It is difficult to show a perfect learning method or model, which can solve all the problems of learners in learning anything with this method or model. Nor are learning methods or models intended to help all types of learning or to implement different learning styles. The creation of learning methods or models is based on the assumption that there are only certain learning methods or models that are suitable to be handled with certain learning methods or models. So, for certain learning, certain learning methods or models are needed. That means there will be many learning methods or models and many learning styles to achieve different learning goals [2].

SMK Negeri 7 Semarang is a vocational high school located in Semarang, Central Java. The school was inaugurated on June 7, 1971 by the President of the Republic of Indonesia, Soeharto, under the name of the Pioneer Project of Semarang Development Secondary Technology School. The education program includes 3 (three) and 4 (four) years of education. SMK N 7 Semarang, or often called STM Pembangunan, has the jargon "No Day Without Achievement". The school has made many achievements in both academic and non-academic fields at the city, provincial and national levels.

The background of this study began during the implementation of UNNES Lantip 3 at SMK N 7 Semarang on August 31 to November 9, 2024. During the implementation of UNNES Lantip 3, the researcher got the opportunity to practice teaching in class 11 majoring in Building Construction, Sanitation, and Maintenance with the subject taught was Construction Cost Estimation. Furthermore, the researcher explored learning in the subject for further research.

Based on pre-research data and the results of interviews conducted on October 30 and 31, 2023 with students of grade 11 KGSP 1 and 12 KGSP 2 of SMK N 7 Semarang, students revealed that the material of Construction Cost Estimation is important to learn as a capital skill in the world of work after graduating from school. This means that students are highly motivated to learn. However, grade 11 students had difficulties in understanding the learning of Construction Cost Estimation, especially in the calculation of volume, material requirements, and wages. Some students revealed that the teacher's explanation was too fast so they did not understand. They also stated that the learning media used by the teacher was still inadequate because it was only limited to the PPT that was explained during the lesson. Therefore, students need additional media to support their learning process.

In learning using the block system, the subject of Construction Cost Estimation is conducted once every two weeks. Some students feel that the frequency of the meeting is inadequate because this subject involves many complex calculations and requires more time to understand. In addition, some students also expressed difficulty in remembering the material that had been delivered at the previous meeting.

Based on the description above and the problems found in the pre-research data in the subject of Construction Cost Estimation, it is necessary to apply a learning model that can improve students' skills and abilities in analyzing and calculating the costs required for the construction of a civil building. These skills include volume calculation, unit price of work, and various other related aspects. To achieve this, an effective learning model and appropriate supporting learning media are needed.

The skill-based learning model is an appropriate approach for this need, as it emphasizes the development of practical skills that can be directly applied in a real-world context. In addition, the use of learning media such as Google Classroom can support the learning process by providing a platform that facilitates access to materials, assignments, and communication between students and teachers. By integrating the Skill Based Learning model and Google Classroom media, it is expected that the learning process of Construction Cost Estimation can be improved, allowing students to better understand and master the necessary skills effectively.

The skill-based learning model is an approach that focuses on the development of practical and applicable skills.

can be applied in a real-world context or in the work environment. In the subject of Construction Cost Estimation, this model is very relevant because students need to understand and master important skills, such as calculation, budget analysis, and cost estimation. These skills involve not only theory, but also practical application that is essential in the construction world. Through this learning model, students can gain in-depth understanding and skills that can be directly used in professional practice, thus preparing them to face challenges in the field and enhancing their readiness to contribute effectively in the construction industry.

Research with the application of the Skill-Based Learning model in learning has been researched by Abdul Hadis with the title "Developing Science Process Skill-Based Learning in Science for Children with Special Needs Course." The results of this study showed that after the application of the Skill-Based Learning model, there was an increase in the quality of student learning achievement.

Google Classroom is a web-based platform developed by Google to support the learning process between teachers and students. Google Classroom provides a comprehensive and intuitive range of features, such as material sharing, assignment collection, and assessment, all designed to facilitate and streamline the education process. These features allow teachers to deliver materials more effectively, while students can easily access materials, do assignments, and receive feedback. The ease of access and use of Google Classroom makes it a very useful tool in education. When combined with the Skill Based Learning model, which focuses on developing practical skills, Google Classroom can reinforce and optimize the learning of Construction Cost Estimating. This integration will provide a more interactive and structured learning environment, supporting students in understanding and applying the necessary skills more effectively.

Research using Google Classroom media for learning Construction Cost Estimation has been researched by Suwari with the title "Differences in the Use of Google Classroom Application Media and Conventional Media on Learning Outcomes of Construction Cost Estimation Subjects of Technology and Property Expertise Program Students at SMKN 1 Blitar." The results of this study indicate that the Google Classroom application media is better or effective in improving learning outcomes.

Based on these things, it is known that the Skill-Based Learning model with the help of Google Classroom media has characteristics that are in accordance with the subject of Construction Cost Estimation. Because

Therefore, the model and media can be applied in this subject. In connection with this, this is the basis for conducting a study through research entitled "Learning Outcomes of Class XI Students of Building Construction and Sanitation Expertise Concentration on Building Construction Cost Estimation Elements at SMK N 7 Semarang with the Application of Skill-Based Learning Model Assisted by Google Classroom Media."

This study aims to determine the learning outcomes of students in class XI concentration of building construction and sanitation expertise in the element of building construction cost estimation at SMK N 7 Semarang after the application of skill-based learning model assisted by google classroom media and to find out the differences in student learning outcomes in the element of building construction cost estimation in phase f construction of sanitation building SMK N 7 Semarang, between skill-based learning model assisted by google classroom media with conventional model.

2. METHODS

2.1 Type of Research

The approach in this study is a quantitative approach, quantitative approach is research that is widely required to use numbers starting from data collection, data interpretation, and appearance of the results. The design used in this research is Quasi Experimental Design with the design used is Nonequivalent [3].

2.2 Place of Research

This research was conducted at SMK Negeri 7 Semarang, which is located at Jl. Simpang Lima, Mugassari, South Semarang Subdistrict, Semarang City, Central Java 50249.

2.3 Population and sample

The population in this study were all grade 11 students majoring in building construction, sanitation, and maintenance, consisting of grades 11 KGSP 1 and 11 KGSP 2, with a total of 65 students in the even semester of the 2023/2024 school year. The sample was divided into experimental and control groups using random sampling by lottery. The results of the lottery showed that class 11 KGSP 2 was the experimental group and class 11 KGSP 1 was the control group.

2.4 Research Variables

In this study there is one variable, namely the Learning Outcomes of 11th grade students of the sanitary building construction concentration of SMK N 7 Semarang on the element of building construction cost estimation.

2.5 Data Retrieval Technique

An instrument is a measuring tool used for data collection. In this study, the technique data collection uses question instruments in the form of initial tests (Pre-Test) and final tests (Post-Test) given to students to

measure understanding and learning outcomes in grade 11 construction cost estimation subjects.

Before being used in research, the instrument consisting of 30 questions was tested first on students outside the research population to measure validity, reliability, difficulty level, and differentiating power. After being tested and measured, 20 items were declared valid, reliable, had a moderate level of difficulty, and good differentiating power, which was then used in this study.

2.6 Data Analysis Techniques

Data analysis technique is a method used to analyze data obtained from research results. Data analysis in this study consists of two parts, namely descriptive analysis and inferential analysis. Descriptive analysis was carried out by presenting data using frequency distribution tables, mean, and standard deviation. Meanwhile, inferential analysis was used to test the research hypothesis using paired sample t-test and independent sample t-test.

This statistical analysis was carried out with the help of the SPSS 24.0 for Windows computer program. Before hypothesis testing was carried out, prerequisite tests, namely normality test and homogeneity test, were carried out as a condition for continuing the research.

3. RESULTS AND DISCUSSION

3.1 Research Data

After conducting a pre-test in the Control class before being given treatment, the average score was 41.58 with the highest score of 55 and the lowest score of 20 with 32 students. While the results in the Experiment class get an average score of 39.6 with the highest score of 55 and the lowest score of 25 with 18 students.

Learning outcomes after being given treatment in the experimental class increased from 39.6 to 74.24. While the control class with conventional learning also experienced an increase in the average value from 41.8 to 45.16. Based on the value of Construction Cost Estimation obtained, it can be concluded that the experimental class has a higher increase than the control class where the experimental class has an increase of 34.64, while the control class is 3.36. The increase in the average value of Construction Cost Estimation can be seen in Table 1.

Table 1. Average Improvement in Learning Outcomes

Class	Pre-test	Post-test	Improved
Experiment	39.6	74.24	34.64
Control	41.8	45.16	3.36

3.1.1 Descriptive Analysis of Control Class

In the descriptive analysis of the control class, the use of data from the pre-test and post-test scores, which have been tested on a sample of 32 students from class XI KGSP 1 at SMK Negeri 7 Semarang, resulting in the acquisition of frequency distribution data listed in Table 2 as follows.

Table 2. Frequency Distribution of Descriptive Data of Learning Outcomes (Post-Test Score) of ControlGroup

No.	Interval	Frequency	Percentage (%)
1	30 -34	6	19 %
2	36 - 40	7	22 %
3	41 - 45	7	22 %
4	46 - 50	5	16 %
5	51 - 55	4	13 %
6	56 - 0	3	19 %

3.1.2 Descriptive Analysis of Experimental Class

In the descriptive analysis of the experimental class, the use of data from the pre-test and post-test scores, which have been tested on a sample of 33 students from the class XI KGSP 2 at SMK Negeri 7 Semarang, resulting in the acquisition of frequency distribution data listed in Table 3 as follows.

Table 3. Frequency Distribution of Descriptive Dataof Learning Outcomes (Post-Test Score) Experimental Group

No	Interval	Frequency	Percentage (%)
1	30 -34	6	19 %
2	36 - 40	7	22 %
3	41 - 45	7	22 %
4	46 - 50	5	16 %
5	51 - 55	4	13 %
6	56 - 0	3	19 %

3.2 Results

3.2.1 Normality Test

The normality test is used to see whether the data is normal or not in the analysis for hypothesis testing. This normality test was carried out using the SPSS 24

program, the results of the Shapiro - Wilk normality test are listed in table 4 Normality test results.

Table 4. Normality Test Results

No.	Description	Asymp.Sig. (2 tailed)
1	Experiment Pretest	0.129
2	Posttest Experiment	0.082
3	Control Pretest	0.134
4	Posttest Experiment	0.156

Based on Table 4, a significance value of more than 0.05 indicates that the data is normally distributed.

3.2.2 Homogeneity Test

Homogeneity test was carried out using the SPSS 24 program, the results of the homogeneity test are listed in Table 5 Homogeneity Test Results

Table 5. Homogeneity Test Results

Description	Significance
Control Class Learning Outcomes Experimental Class Learning Outcomes	0.703

Based on Table 5, the significance value of the control and experimental classes is more than 0.05, indicating that the data distribution is homogeneous.

3.2.2 Hypothesis Test

1. Paired Sample T Test

After the data is normally distributed, the next step is the paired sample t test of the experimental group which is carried out using the SPSS program, a summary of the calculation of the independent sample t test is listed in Table 6 below:

Table 6. Paired Sample T Test Results

Experiment Pretest	df	Sig (2 tailed)
Posttest Experiment	32	0.000

In Table 6, the results of the Paired Sample T Test conducted using the SPSS 24 application show a significance value (2-tailed) of 0.00 <0.05. This means that there is a difference, so it can be seen that there is a difference in the average value between the pre-test value (before the application of the Skill Based Learning model assisted by Google Classroom media) and the post-test value (after the application of the Skill Based Learning model assisted by Google Classroom media).

2. Independent sample t test

After the data is normally distributed and homogeneous, the next step is the independent sample t test which is carried out. (experimental class) and the conventional learning model (control class).

using the independent sample t test calculation summary program is listed in Table 7 below:

Table 7. Independent sample t test results

Posttest Control	df	Sig (2 tailed)
Posttest Experiment	63	0.000

In Table 7, the results of the t test conducted using the SPSS 24 application show a significance value (2- tailed) of 0.00 <0.05. This means that there is a difference, so it can be seen that there is a difference in student scores between the application of the Skill Based Learning model with Google Classroom media

3.3 Discussion

The results of this study indicate a difference in the average value between the pre-test and post-test values on the application of the Skill Based Learning model assisted by Google Classroom media to the element of construction cost estimation, with the post-test value higher than the pre-test value. In addition, this study shows that there is a difference in student learning outcomes in the element of construction cost estimation between the application of the Skill Based Learning model assisted by Google Classroom media and the conventional learning model. The value of learning outcomes from the application of the Skill Based Learning model assisted by Google Classroom media is higher than the application of conventional learning models. Thus, learning by using the Skill Based Learning model with Google Classroom media is able to influence the improvement of student learning outcomes and is better than conventional learning models.

The results of this study are in line with the findings of Hadis and Nurhayati [4] with the title "Developing Science Process Skill Based Learning in Science for Children with Special Needs Course". which shows that the application of skill-based learning models improves student learning outcomes. In addition, this study also supports the results of Suwari [5] research with the title "Differences in the Use of Google Classroom Application Media and Conventional Media on the Learning Outcomes of Construction Cost Estimation Subjects of Technology and Property Expertise Program Students at SMKN 1 Blitar", which found that the use of Google Classroom media is more effective than

conventional learning media in improving student learning outcomes in construction cost estimation subjects.

The Skill Based Learning model assisted by Google Classroom media provides a structured approach that allows students to conduct in-depth practical exercises to calculate volume, material requirements, wages, and unit prices. This approach enhances students' practical skills, analytical ability, and calculation accuracy, so that they are able to Calculate material requirements, wages, and unit prices for various construction works more accurately and efficiently.

The model proved effective in improving students' practical skills, such as calculation, budget analysis, and cost estimation, which are essential in the subject. By utilizing Google Classroom media, students can access materials and exercises in a structured and step-by-step manner, which contributes to increased precision and accuracy in calculations. These results show that this learning approach not only enhances concept understanding, but also improves students' academic performance in a context relevant to the world of work and the construction industry.

Therefore, the implementation of Skill Based Learning model assisted by Google Classroom media can be considered as an effective strategy to improve students' learning outcomes in the subject of construction cost estimation, and can be recommended for use in teaching in grade eleven phase F as well as other related subjects.

4. CONCLUSION

4.1 Conclusion

Based on the results of the research and discussion, it can be concluded that the application of the Skill Based Learning model assisted by Google Classroom media improves student learning outcomes on building construction cost estimation elements and is better than conventional learning models. This is indicated by the average post-test value (74.24) which is higher than the pre-test value (39.39) in the experimental class, while the control class post-test value of (45.16) is much lower than the experimental class. Hypothesis testing (Paired sample t-test) shows a significant difference, and hypothesis testing (Independent sample t-test) also shows a significant difference.

4.2 Advice

Based on the results of the research that has been carried out, the skill-based learning model assisted by google classroom media can be used in construction cost estimation maps and maps that have similar characteristics. because this model is able to improve students' skills and learning outcomes, besides that there are several suggestions, namely:

1. For Learners: During the learning process, students are expected to always improve their skills and abilities in analyzing and calculating construction cost estimates. This can be done by doing structured exercises that have been given by the teacher seriously. Thus, students' skills will experience a better improvement, so that their learning outcomes will get high scores.
2. For Teachers: In the application of *skill-based learning*, it is necessary to further improve students' skills and abilities in analyzing and calculating cost estimates.

construction through the structured exercise method. In this way, it is expected that students' learning outcomes will be better than before.

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