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Research Article

Effectiveness of SAVI Learning Model on Learning Outcomes of Cost Plan Elements and Scheduling of Building Construction

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ABSTRACT

This study aims to determine the effectiveness of the SAVI learning model on student learning outcomes in the element of Cost Planning and Scheduling of Building Construction in class XI DPIB. The research used quantitative method with quasi-experimental design. Data were collected through observation and cognitive tests with 21 multiple choice questions. The research sample was 48 students from class XI DPIB 1 and XI DPIB 2 at SMK Negeri 1 Percut Sei Tuan. Data analysis was conducted using Paired Sample T-Test and N-Gain Test. The results showed significant differences between SAVI and conventional learning models with average learning outcomes of 83 and 61 respectively. 22 students in the SAVI model reached the Minimum Completion Criteria (KKM), higher than 10 students in the conventional model. The SAVI learning model showed an effectiveness of 59.010, which is included in the Moderately Effective category. Thus, the SAVI learning model can be used as a learning strategy to improve student learning outcomes that encourage more optimal student involvement.

Keywords: Effectiveness; SAVI Learning Model; Student Learning Outcomes.

1. INTRODUCTION

Quality education is the main pillar in the development of a nation. A developed nation is characterised by a strong, inclusive education system and the creation of Human Resources (HR) that are competent, characterful and adaptive to global change. Through structured and competency-based education, knowledge and skills can be effectively transmitted to the younger generation to contribute significantly to the development of a more advanced and sustainable nation. Competency-based education in Indonesia is Vocational High School (SMK) which contributes to producing graduates to become a competent and work-ready workforce in the business world and the industrial world. This can be achieved if education in SMK, especially teachers, has the right and quality learning patterns and learning outcomes in accordance with the media and learning strategies for students (Nurcahyani, 2021). Teachers have a huge influence on education in Indonesia. Wulandari et al. (2020) asserted that teachers have the responsibility and hold an important position as professionals in order to realise the goals of education in Indonesia in 2025 by fostering highly competitive intellectuals. Therefore, professional teachers are needed who can formulate appropriate learning approaches for students, especially in the element of Building Construction Costing and Scheduling Plan in the concentration of Building Modelling and Information Design (DPIB) expertise. This element has learning outcomes, namely students being able to estimate real costs in building planning by making a Cost Budget Plan (RAB), work schedule, and S curve.

The results of observations at SMK Negeri 1 Percut Sei Tuan in class XI DPIB on the element of Cost Planning and Scheduling of Building Construction show that the passing rate of student exam results based on the Minimum Completion Criteria is 12 people with a percentage of 40% of the total, while the number of students who have not met the KKM is 18 people or 60%. The KKM value determined by the school is 70. So this data shows that the level of student understanding of the subject matter is still relatively low. Low student learning outcomes affect their understanding and competence. One of the factors that hinder the learning process is the lack of variety in learning methods. Teachers still use conventional methods which have an impact on decreasing learning motivation, the emergence of a sense of boredom and boredom with learning material which makes a decrease in the level of student understanding. In addition, learning is still dominated by one-way where the teacher acts as the sole provider of information. Good learning makes students the centre of learning and active in learning. This aspect is often overlooked by teachers, even though teachers have an important role in influencing the learning process to foster students' personalities, attitudes, and increase awareness (Azahar & Siregar,

2024). Teachers are expected to change the state of learning to be optimal, effective and relevant (Khoerunnisa & Aqwal, 2020). Seeing this condition, there is a need for intensive efforts made by teachers to optimise student understanding in receiving material and increase learning effectiveness. This improvement can be done with various learning strategies, namely learning models. The diversity of learning models is expected to be able to provide stimulation to students to optimise learning outcomes (RimahDani et al., 2023; Rusiadi, 2020). In the context of learning, learning models are guidelines for teachers to create conceptual frameworks, procedures, experiences in the learning environment that function to plan, implement, and construct learning activities. Relevant learning models have an impact on student learning outcomes (Handika et al., 2024). One of the learning models that is relevant to student activities and uses all senses in learning is the Somatic, Auditory, Visual, Intellectual (SAVI) model.

The SAVI learning model is a learning approach that involves and emphasises all five senses in the learning process (pedagogical) (Minardiningsih, 2019). The SAVI learning model consists of four parts, namely Somatic (kinetic), Auditory (listening), Visual (observation), and Intellectual (problem solving or critical thinking) (Rahayu et al., 2019). Somatic learning involves active physical activity in the learning process, while auditory learning focuses on using the sense of hearing. Visual learning utilises the sense of sight, where learners can understand the material through tangible examples such as diagrams, mind maps and icons. Direct observation in visual learning increases students' interest and provides a new learning experience. Intellectual learning encourages students to think critically, use their intelligence to reflect on experiences and build relationships, meanings, plans and values (Indrawan, 2018). The SAVI learning model has characteristics by encouraging student activeness in learning activities that make students not only gain knowledge theoretically, but also can directly construct, master and experience the knowledge they have learned more deeply based on experience (Kholil & Sholeh, 2021). Sutarna (2018) states that the SAVI learning model is effective in improving student learning outcomes. Lestari (2020) revealed that the application of SAVI learning model can improve learning outcomes and skills of critical thinking, collaborative, communicative, creative. By applying the SAVI learning model can improve student learning outcomes (Hasmi & Retti, 2022; Kusumantara et al., 2017; Nadhiah & Wulandari, 2020). In addition, the SAVI learning model can increase creativity and be effective in metacognitive and critical thinking (Fitriandari, 2022; Hasan et al., 2023). Based on the findings of the above problems, this study aims to determine how the effectiveness of the SAVI learning model on the learning outcomes of Building Construction Cost Planning and Scheduling class XI DPIB.

2. RESEARCH METHOD

This research uses quantitative research methods carried out at SMK Negeri 1 Percut Sei Tuan in the 2023/2024 school year for 4 meetings (3 x 45 minutes). The research design used is Quasi Experimental which consists of experimental class using SAVI learning model and control class using conventional learning model. The population in this study were students of class XI Building Modelling and Information Design with a research sample of class XI DPIB 1 and DPIB 2 which amounted to 48 people. Data collection techniques used include two methods. First, observation. Conducted to observe the teaching and learning process, observe the learning module, learning media and learning materials used by the teacher. Second, cognitive tests. Conducted to collect the learning outcomes of experimental and control class students. Cognitive tests in the form of multiple choice, totalling 21 items prepared based on independent curriculum indicators and analysed using validity test, reliability test, difficulty index test and differentiator test. Furthermore, hypothesis testing was carried out using normality test, homogeneity test, t test and Test (N-Gain) with the help of SPSS version 23.

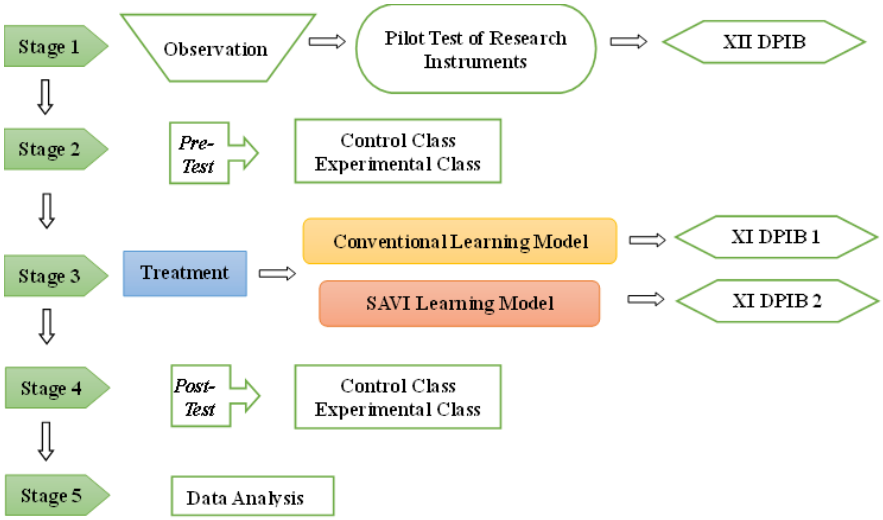

Figure 1. Research Design

3. RESULTS AND DISCUSSION

3.1 Pilot Test of Research Instruments

Instrument tests were carried out to measure the level of difficulty and differentiation of questions. The instrument was in the form of 25 multiple choice questions with 5 choices done in 30 minutes. The results of the instrument analysis showed that 21 items were valid, while the other 4 items were invalid. Therefore, this study used 21 items as instruments. Furthermore, a reliability test was conducted which showed a reliability coefficient of 0.881 with a very high category. The valid and reliable instruments were then tested for difficulty level to assess the difficulty of the questions and differentiation. The analysis results showed that 3 questions were in the difficult category, 6 questions were moderate, and 12 questions were easy. While in the differentiating power there is 1 question with a very good category, 10 questions are good, 9 questions are sufficient, and 1 question is not good enough.

3.2 Descriptive Analysis

Table 1. Descriptive analysis results

Data	Control Class		Experimental Class	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Highest Score	71	86	76	95
Lowest Score	33	42	43	58
Mean	56	61	62	83
Standard Deviation	10.747	12.406	8,812	9,538
Varians	115.505	153.897	77.645	90.978

The data showed that the experimental class had a cognitive value in the pre-test of 76 and post-test of 95. While in the control class the pre-test was 71 and the post-test was 86, with a significant increase in the average value in the experimental class.

3.3 Normality Test

Table 2. Normality test results

Class	Data	W_{count}	W_{table}	Significance	Description
Control Class	Pre-Test	0.923	0.916	0.069	Normal
	Post-Test	0.922	0.916	0.064	Normal
Experimental Class	Pre-Test	0.923	0.916	0.069	Normal
	Post-Test	0.922	0.916	0.064	Normal

Based on the results of the normality test on the pre-test and post-test, the value (W_{count} = 0.923 and 0.922) > (W_{table} = 0.916) was obtained in the control class. While in the experimental class, the statistical value (W_{count} = 0.923 and 0.922) > (W_{table} = 0.916).

3.4 Homogeneity Test

The homogeneity test was conducted to ensure that both groups had the same variance before treatment.

Table 3. Homogeneity test results

Class	Data	F_{Count}	F_{table}	Significance	Description
Control and Experiment	Pre-Test	2.854	4.301	0,098	Homogeneous
Control and Experiment	Post-Test	3.579	4.301	0,065	Homogeneous

The results of the analysis show that the value of $F_{count} < F_{table}$ and a significance value greater than 5%. Thus, the assumption of homogeneity of variance is fulfilled.

3.5 Hypothesis Test (t-test)

The t-test is used to test the hypothesis whether there is a significant difference in learning outcomes between the control and experimental classes after the application of the SAVI learning model.

Table 4. Results of the t-test

Value	Mean	Std. Dev	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Post-Test control – *Post-Test* Experiment	-22.625	5.420	1.106	-24.914	-20.336	-20.451	23	0.000

Based on the **Table 4,** it shows that the Sig. (2-tailed) < 0.05 which states that H_0 is rejected and H_1 is accepted. Acceptance of the H_1 hypothesis means that there is a significant difference in the learning outcomes of the control class and the experimental class due to the application of the SAVI learning model in the experimental class.

3.6 N-Gain Test

The N-Gain test was used to test the effectiveness of the SAVI learning model on learning outcomes in the experimental class. The test results showed that 9 students achieved high improvement, while 14 students were in the medium improvement category. Only 1 student experienced low improvement, and there were no students whose learning outcomes stagnated or decreased.

Table 5. Criteria for determining the level of effectiveness

N-Gain Value	Interpretation	N-Gain-Percentace (Mean)	Description
< 40	Not Effective	59.010	Moderately Effective
40 – 55	Less Effective		
56 – 75	Moderately Effective		
> 76	Effective		

Based on the data **Table 5**, the N-Gain_Percent value is 59.010 which is classified as Moderately Effective in improving student learning outcomes. This level of effectiveness indicates that the method used has good potential that can improve student understanding to achieve more optimal results. This achievement is a positive indicator that the learning model is in the right direction. Based on the analysis, the learning outcomes of control class and experimental class students are grouped into 4 categories in **Table 6**.

Table 6. Student learning outcomes

Data	Control Class		Experimental Class	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Very Competent	0	0	0	9
Competent	0	2	0	8
Fairly Competent	2	8	4	5
Not Competent	22	14	20	2

The data **Table 6**, shows that there are 22 students in the incompetent category and 2 students in the moderately competent category in the control class. While in the experimental class there were 20 students in the incompetent category and 4 students in the moderately competent category. After the SAVI learning model was implemented, the second cognitive test was given to the control class and experimental class. The results showed that in the control class there were no students who reached the highly competent category and only 2 students managed to reach the competent category. In addition, 8 students improved into the moderately competent category and 14 students were not competent. Meanwhile, in the experimental class, 9 students reached the highly competent category and 8 students were in the competent category.

Table 7. Student learning outcome completeness score

Class	KKM (< 70)		KKM (> 70)		Total Students
	Total	Percentage (%)	Total	Percentage (%)	
XI DPIB 1	14	58%	10	42%	24
XI DPIB 2	2	8%	22	92%	24

Based on the completeness score obtained, class XI DPIB 2 showed better results compared to class XI DPIB 1 in achieving the KKM score. A total of 92% of students in class XI DPIB 2 managed to achieve a score above the KKM (> 70), compared to the score in class XI DPIB 1 which obtained 42%. In contrast, 58% of students in class XI DPIB 1 scored below the KKM (< 70), much higher than the 8% of students in class XI DPIB 2.

This result shows that the level of achievement of learning outcomes of students in class XI DPIB 2 is higher than students in class XI DPIB 1. The SAVI learning model can improve student learning outcomes (Dapa & Kiriweno, 2019; Pratiwi & Puspasari, 2021; Serevina et al., 2023; Wahyuni et al., 2019; Widyastuti et al., 2020). Students are more active in learning and easily understand any material provided by the teacher. Teachers have an important role in designing SAVI learning that acts as a facilitator in the learning process. This is supported by research by Yuliana et. al. (2020) which shows that teachers provide motivation, simplify subject matter, and look for references from various sources to support active learning.

SAVI learning integrates four main elements: somatic (physical activity), auditory (hearing), visual (seeing), and intellectual (thinking). The results showed that 22 students achieved scores above the KKM (> 70), while 2 students were below the KKM (< 70). The success of this SAVI learning model can be explained through the following factors: First, the learning approach. The SAVI model integrates various sensory channels to strengthen the learning process. This approach includes physical (somatic) activities, i.e. simulated construction projects that provide hands-on experience, as well as involving auditory (listening to explanations), visual (viewing diagrams or videos), and intellectual (solving problems or analysing) elements. With this combination, students understand the material and concepts through hands-on experience and deep thinking. Secondly, it increases student engagement. This model encourages students to actively participate in learning through discussions, presentations and collaborative activities. Such active participation helps students feel more connected to the material being taught, reinforces understanding, and boosts their confidence. As a result, students are more motivated to explore complex concepts and engage deeply in the learning process, creating a dynamic and productive learning atmosphere. Third, the utilisation of visual media: The use of visual aids, namely animated videos, and attractive multimedia presentations helps students understand the material. Animated videos depicting the construction process can provide a real picture of the stages of work that need to be done, making it easier for students to understand the concepts of scheduling and cost management.

The results of this study indicate that the implementation of the SAVI learning model is significantly more effective than the conventional learning method. This difference indicates that the SAVI model is more capable of improving student learning outcomes, particularly in understanding complex material on the Elements of Cost Planning and Scheduling of Building Construction. The SAVI model allows students to learn through hands-on and interactive experiences, which ultimately improves knowledge retention and conceptual understanding.

4. CONCLUSION

Based on the results of the research conducted, it can be concluded as follows: First, there is a significant difference in learning outcomes between the SAVI learning model and the Conventional learning model with an average value of 83 and 61. Second, students taught with the SAVI learning model obtained a higher Minimum Completion Criteria value compared to the Conventional learning model. Third, the SAVI learning model obtained an effectiveness value of 59.010 which is classified as Moderately Effective in improving student learning outcomes. These results indicate that the application of the SAVI learning model can improve student learning outcomes on the elements of the Building Construction Costing and Scheduling Plan in class XI DPIB at SMK Negeri 1 Percut Sei Tuan. Suggestions for future research are to use a larger research sample and conduct research using more independent and dependent variables so that the problems faced in the world of education can be resolved and solutions found.

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