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Research Article

The SAVI Learning Model and the 21st Century Skills: Developing Critical Thinking, Collaboration, and Creativity in Students Vocational High School

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Abstract: The use of the SAVI learning model offers a more effective alternative in improving student learning outcomes by understanding individual learning preferences and providing learning strategies that follow the objectives of this study, namely to evaluate the use of the SAVI learning model for vocational high school students. The research approach used in this study is quantitative, using numbers and statistical analysis. The research design used was pre-experimental in a one-group pretest-posttest design. The present research study focused on the student population enrolled in vocational high schools in Makassar, Indonesia. Purposive sampling was used to select the most suitable sample for achieving the research objectives. The sample size consisted of 30 students, 25 of whom were male and five females. The SPSS Program enters data, performs statistical analysis, and visualizes the research results. The hypothesis test is tested at a significance level of 0.05. The results of testing the hypothesis using the SPSS application with the paired sample t-test data analysis technique obtained a significance of 0.000 where 0.000 < 0.05, which means that H0 is rejected and H1 is accepted. The analysis results prove that student learning outcomes (post-test) have increased compared to (pre-test). The SAVI learning model is more efficacious than traditional learning approaches, as it affords students a more engaging, enjoyable, and enduring educational encounter. It can serve as a pragmatic substitute for enhancing the caliber of education and students' academic achievements.

Keywords: Auditory Learning; Intellectual Learning; Somatic Learning; Visual Learning.

1. Introduction

Each person's and society's standard of living importantly benefits from the opportunities made available through educational institutions [1], [2]. It is a way to expand one's horizons and financial and social standing. Education aims to produce critical thinkers and problem solvers capable of meeting the many challenges of the modern world [3]. Education provides individuals with the tools to adapt and flourish in a swiftly changing global environment by fostering a passion for learning and cultivating critical thinking and problem-solving skills. The assessment of academic achievement among students plays a crucial role in determining the standard of education [4]. The significance of acknowledging that identical content exposure through curriculum and instructional materials does not necessarily result in uniform learning outcomes among students cannot be overstated [5], [6]. Every student has a distinct combination of learning preferences, cognitive capabilities, and individual variations in their reception, processing, and application of information [7], [8]. Acknowledging and making provisions for these

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variations is imperative in promoting successful educational results.

The current focus is on the creation and execution of educational frameworks that prioritize the unique learning preferences of each individual to tackle this matter. [9]. Personalized learning methodologies are designed to customize instruction and support per each learner's individualized needs and preferences. This entails considering various aspects such as individual learning preferences, areas of interest, and pace of learning. Personalized learning models have been found to enhance engagement, motivation, and comprehension, ultimately resulting in better learning outcomes through tailored learning experiences [10].

The pursuit of education, as a fundamental aspect of human activity, embodies the highest level of cultural accomplishment and functions as a heritage transmitted from one cohort to succeeding ones [11]. As mentioned above, the statement highlights the significance of cultural heritage in influencing the future course of individuals and their lifestyles within a given socio-cultural milieu. It is a repository of societal wisdom, knowledge, and values. Through investing in education, successive generations significantly enhance societal well-being, promote harmonious coexistence, foster economic growth, and facilitate sustainable development [12]. The importance of education in improving the standard of living for both individuals and society is immeasurable. The objective is to cultivate individuals who can tackle current challenges by developing intelligence, creativity, and innovation.

Student learning outcomes are an essential factor in determining the quality of education [13]. Therefore, extensive research has been conducted to explore practical and efficient learning models for improving student learning outcomes. Learning is a multifaceted process involving cognitive, affective, and social aspects [14]. Each individual has unique ways of receiving, processing, and applying information, resulting in varying levels of learning success [15]. This underscores the need for learning models focusing on individual learning preferences [7]. Effective learning involves recognizing personal learning preferences and providing strategies that align with each student's inclinations [16]. Based on this concept, the Somatic Auditory Visualization Intellectually (SAVI) learning model was developed to understand personal learning preferences and generate tailored learning strategies for each student's tendencies [17], [18]. The SAVI learning model integrates three learning techniques: somatic, auditory, and visual, to enhance students' learning effectiveness and memory retention [19]. Somatic techniques involve physical movement, auditory methods encompass listening, and visual techniques employ images or graphics in education [20]. By combining these three techniques, the SAVI learning model can facilitate improved comprehension and recall of the material.

The SAVI learning model can also assist teachers in designing flexible and adaptive learning strategies that cater to students' individual needs [21]. By understanding students' learning preferences, teachers can customize learning techniques and methods according to each student's requirements, thus enhancing learning effectiveness [22]. In the digital era, the SAVI learning model can be integrated with learning technology, such as educational videos, gamified learning experiences, and multimedia applications, to enrich students' learning experiences and foster greater engagement with the learning materials [23].

In their research, Dunn and Dunn [18] stated that only 20% to 30% of school-age children appear to be auditory learners, 40% are visual learners, and 30% to 40% are kinesthetic learners. Barbe and Milone [24] stated that for elementary school students, the most frequent power modalities were visual (30%), audio (25%), audio-visual (30%), and kinesthetic (15%) learners. This research proves that students' learning styles are different. However, in the application of learning, some teachers or educators pay less attention that knowledge using the lecture method for a long time is considered less effective. The research results in Helmiati's [25] show that students can only concentrate fully around 60% of the time in learning to deliver material orally. The student's endurance to focus on listening or controlling the ear senses is minimal. Several studies have been conducted to examine the effect of the SAVI learning model on student learning outcomes. Research conducted by [26], [27] shows that the SAVI learning model positively influences student learning outcomes in elementary schools. In addition, research conducted by [28], [29] also found similar results in high school students. However, several studies still do not see a significant effect between using the SAVI learning model and student learning outcomes.

The SAVI Learning Model is a learning model that was first coined by Dave Meier [30]. The details of the SAVI learning model consist of four aspects. First, Somatic, which is learning using bodily movements through doing activities. Second, Auditory, namely learning by using the sense of hearing through listening activities. Third, Visual, namely learning to use the sense of sight through observing activities. Fourth, Intellectual, namely learning by using the brain through thinking activities and solving problems. The SAVI learning model is attractive because it can improve student learning outcomes by integrating four different learning aspects. Although several studies show the positive influence of the SAVI learning model on student learning outcomes, more systematic research is still needed to examine the effectiveness of this learning

model in more depth. This can be done in further research using a larger sample and various research methods. This can help to clarify the effect of the SAVI learning model on student learning outcomes and provide recommendations for its use in educational settings.

The use of the SAVI learning model offers a more effective alternative in improving student learning outcomes by understanding individual learning preferences and providing learning strategies that follow the objectives of this study, namely to evaluate the use of the SAVI learning model for vocational high school students. By integrating technology into learning, this model can be an innovative solution to strengthen the quality of education in today's digital era.

2. Material and Methods

2.1. Research Approach and Design

The present study employs a quantitative research methodology. The research above methods is characterized by using numerical data and statistical analysis. The statistical outcomes can demonstrate the significance of the sought-after relationship. The direction of the obtained relationship is contingent upon the hypothesis and statistical test outcomes rather than scientific reasoning. The quantitative methodology necessitates the utilization of numerical data, commencing from data acquisition, analysis, and the subsequent presentation of findings.

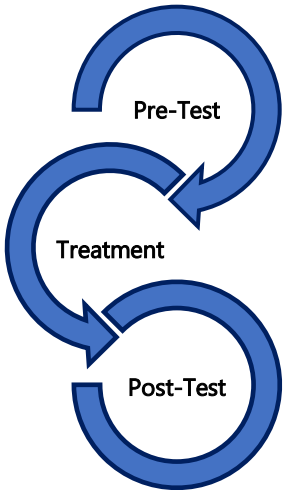

Figure 1. Pre-experimental Design

The study employed a pre-experimental research design, specifically a one-group pretest-posttest design. The use of a single group in the research design was due to applying a pre-experimental strategy that solely administered treatment to one subject without including a control group. The present method incorporates exogenous factors that impact the endogenous variable. This phenomenon may occur due to the absence of a control group and a randomized sampling procedure.

In this study, a pre-test was given to students as the object of research before being given treatment to determine students' initial scores. While the post-test or final test is carried out at the end of the study or after providing treatment to find out the final grades obtained by students, then processes the data and concludes the results or objectives of the research.

2.2. Population and Sample

The population is a critical component of research as it serves as the primary data source for the investigation. The present research study focused on the student population enrolled in vocational high schools in Makassar, Indonesia. The sample size consisted of 114 respondents. The researcher used purposive sampling, a nonprobability sampling technique, to choose the sample for the study.

Purposive sampling, also known as purposive or judgmental sampling, is a research technique in which individuals are deliberately selected based on predetermined criteria or considerations aligned with the study's objectives [31]–[33]. The present study employed purposive sampling to select the most suitable sample for achieving the research objectives. The researchers determined that the sample size for the study consisted of 30 students. Among the cohort of 30 students, the majority, precisely 25 individuals, identified as male, while the remaining five identified as female. The sample's gender distribution was designed to accurately mirror the proportional representation of male and female students in the population.

The researcher employed purposive sampling to strategically select a sample yielding valuable insights and meaningful data aligned with the study's objectives. The methodology used by the researcher facilitated a full investigation of pupils hailing from vocational high schools located in Makassar, thereby ensuring a heterogeneous cross-section of male and female students in the sample.

2.3. Research Instrument & Data Analysis Techniques

For this study, researchers employed a multiple-choice questionnaire. One of the most common forms of assessment used in academic studies is the multiple-choice test. Multiple-choice answers have been provided for multiple-choice this test. There is only one right answer to each question. A feasibility test correct be performed before the research instrument is used to ensure it will generate accurate results. The validity test in this investigation is the feasibility analysis. The validity of a measuring device is defined as its accuracy in capturing the target variable. A research instrument is valid and reliable

for measuring learning outcomes if and only if its validity has been thoroughly tested and found to be high. However, if the validity test reveals that the research instrument is invalid, it must be modified or improved before null is used in studies.

The methodology employed for data analysis comprises both descriptive and inferential statistics. The data about student learning outcomes in the experimental class were analyzed using descriptive statistics using the SAVI learning model. The primary objective of descriptive statistics is to provide a summary of the data that has been collected without attempting to draw any overarching conclusions or generalizations. In contrast, inferential statistical techniques for data analysis are employed to make inferences based on research findings from multiple samples of a larger population. In the realm of research, it is anticipated that conclusions will be drawn following the proposed hypotheses—the utilization of the SPSS software for data analysis. The software above is commonly utilized to conduct quantitative data analysis within statistics. This software facilitates the input of data, execution of statistical analysis, and generation of graphical or tabular representations of research findings by researchers. The present study facilitates researchers' expeditious and facile interpretation of data analysis outcomes.

3. Result and Discussion

3.1. Descriptive Analysis

Descriptive statistics are utilized to analyze data by describing the collected data without drawing inferences or generalizing. The descriptive statistical analysis serves as a means of elucidating the features of the distribution of academic achievement among students while also providing solutions to the research questions posed. The present study employed descriptive analysis to depict students' learning outcomes in the experimental group comprising 30 participants. The pre-test was administered before implementing the SAVI learning model, while the post-test was conducted after applying the SAVI learning model. The description of the descriptive statistics on the test results is as follows:

Table 1. Descriptive Statistical Test Results

Range	Total Students		Description
	Pre-Test	Post-Test	
80 – 100	0.00	8.00	Excellent
66 – 79	0.00	6.00	Good
56 – 65	2.00	8.00	Enough
40 – 55	10.00	6.00	Less
< 39	18.00	2.00	Failed

Based on the table above, it can be seen that the data comparison of students' cognitive learning outcomes before treatment (pre-test) and after treatment (post-test). The pre-test data showed that out of 30 students, there were 20 students in the failed category, ten students in the less category, two in the good category, and no students classified as good and very good categories. While the post-test data shows that of the two students in the failed category, six students are in the less category, eight are in enough category, six are in a good category, and eight are in the excellent category. This is because the learning process with the application of the SAVI learning model (Somatic, Auditory, Visual, Intellectual) can be applied to student cognitive learning outcomes so that it can influence student understanding.

The SAVI learning model is designed to fully engage students' integrated intelligence by integrating physical movement with intellectual activity. This approach cultivates students' capacity for critical thinking and encourages them to articulate their viewpoints confidently. Furthermore, the SAVI model is adaptable to diverse learning styles, making it a versatile and effective pedagogical tool [34]–[36].

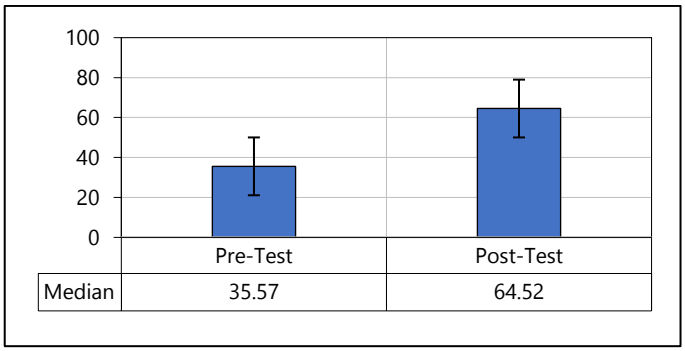

Figure 2. The Average Value of The Pre-Test and Post-Test Results

Based on the descriptive statistical analysis results, a significant difference was found between the pre-test and post-test scores of the students. In the pre-test data, the lowest score was 15; in the post-test data, the lowest value reached 25. The highest score in the pre-test data was 70, while in the post-test data, the highest value went 95. The average pre-test value was 35.57, while the average post-test value was 64.52. The average difference between the pre-test and post-test is 28.95.

This finding indicated that students experienced a significant increase in their achievement from the pre-test to the post-test. In general, the scores obtained by students on the post-test tend to be higher than those on the pre-test.

These results are consistent with previous research showing that learning interventions or programs can

positively impact student achievement. Studies that are relevant in this context support your findings. For example, research by Smith et al. involves a group of students who follow a particular learning program in mathematics [37]. This study showed a significant increase in post-test scores compared to the pre-test.

Another relevant research is a study conducted by Johnson et al. [38], which evaluated the effectiveness of a particular teaching method in improving students' reading ability. Statistical analysis in this study showed a significant difference between the pre-test and post-test scores, with a higher average post-test score. A deeper understanding of the factors contributing to improving student achievement can be obtained through an inferential statistical analysis involving hypothesis testing or regression analysis. Thus, it is suggested that future studies involve these methods to test the statistical significance of the differences between pre-test and post-test.

This descriptive statistical analysis provides a solid initial picture of differences in student achievement between the pre-test and post-test. This finding has important implications for the development of education and learning. Follow-up studies can focus on identifying effective learning strategies to improve student achievement and understanding other factors influencing these differences.

3.2. Inferential Analysis (Paired Samples t-test)

The inferential t-test analysis is a statistical methodology utilized to compare two samples that follow a normal distribution and ascertain whether the observed difference between the two samples is statistically significant or not. The inferential analysis of the t-test involves the null hypothesis, which posits the absence of a substantial difference between the two samples, and the alternative hypothesis, which sets a significant difference between the two samples.

The hypothesis on the Paired samples t-test tests the difference between two related or paired samples (before and after the intervention on students). The null hypothesis in the Paired samples t-test states no significant difference between the two paired samples, while the alternative theory states a considerable difference between the two samples. Based on the results of statistical data obtained with the help of the SPSS application, the following data can be presented:

Table 2. Results Paired Sample Statistics Results (N=30)

	Mean	Std. Deviation	Std Error Mean
Pre-test	34.25	13.886	3.105
Post-test	62.00	17.874	3.997

Table 3. Paired Sample Correlations

	N	Correlation	Sig.
Pre-test & Post-test	30	0.572	0.027

The paired sample statistics results for a pre-test and post-test, with a sample size of 30, are presented in Table 2. The pre-test mean score of 34.25 represents the participants' average performance before implementing the intervention or treatment. The value of 13.886 for the standard deviation denotes the extent of variation or scattering of data points from the arithmetic mean. Estimating the sample mean's variability from the population mean is achieved by calculating the standard error of the mean (SEM), which has been determined to be 3.105.

The post-test mean score of 62.00 represents the average performance of the participants after the intervention or treatment. The value of 17.874 as the standard deviation indicates the degree of variability or dispersion of the scores from the mean in the post-test. The post-test standard error of the mean (SEM) has been computed as 3.997, which indicates the extent of deviation of the sample mean from the population mean following the intervention.

Table 3 presents the paired sample correlations between the pre-test and post-test scores. The computed correlation coefficient of 0.572 suggests a positive association between the two sets of scores. The data indicates a significant correlation between the pre-test and post-test performances of the participants, with a moderate to strong positive association. The correlation coefficient is reported alongside a significance level denoted as "Sig." with a value of 0.027. Given that the significance level is below the customary threshold of 0.05, it is possible to infer that the correlation is statistically significant. The statement above implies that the correlation observed is improbable to have arisen randomly, thus providing additional evidence for a connection between the pre-test and post-test scores.

The paired sample statistics and correlations analysis indicates that the participants' performance improved from the pre-test to the post-test. Furthermore, a statistically significant positive correlation exists between the two sets of scores.

Table 4. Paired Samples t-test

	Mean	Std Error Mean	t	df	Sig.
Pre & Post-test	26.250	4.272	6.154	29	0.000

Decision-making regarding whether or not the hypothesis test is accepted is carried out at a significance level of 5% or 0.05. the results of testing the hypothesis using the help of the SPSS application with the paired sample t-test data analysis technique obtained a significance of 0.000 where 0.000<0.05 so that H_0 is rejected and H_1 is accepted, namely that there is an effect of applying the SAVI learning model (Somatic, Auditory, Visual, Intellectual) on learning outcomes cognitive aspects of students.

The analysis results prove that student learning outcomes after treatment (post-test) have increased compared to before treatment (pre-test). This aligns with the opinion of Simbolon et al. [39], explaining that Somatic- learning is by doing, Auditory-learning is by listening, Visual-learning is by seeing, and Intellectual-learning by thinking. Furthermore, according to Shoimin [40], SAVI is an abbreviation for somatic, which refers to bodily movements involving physical activity and hands-on learning. This approach emphasizes learning through experience and practical application. The term "auditory" refers to acquiring knowledge and skills through listening, engaging in verbal communication, delivering presentations, engaging in debates, expressing one's viewpoints, and providing feedback.

The concept of visualization entails the utilization of visual senses, such as observation, drawing, demonstration, reading, and the use of media and props, as a means of facilitating learning. "intellectually" refers to the utilization of cognitive faculties in education emphasizing the importance of engaging the mind meaningfully and actively. Effective learning requires focused attention and deliberate practice, which involves engaging in activities such as analysis, investigation, problem-solving, and application of knowledge. This pedagogical approach aims to optimize student engagement and participation in the educational experience.

Research on the SAVI learning model improves students' learning skills and memory [41], [42]. Therefore, the SAVI learning model can be used as a more practical alternative to improving the quality of learning and student learning outcomes. In addition, the SAVI learning model also encourages the active involvement of students in the learning process, thereby strengthening learning motivation and metacognitive skills. In this model, students become more involved in understanding and applying the information provided, increasing their ability to solve problems and obtain better learning outcomes [27], [43].

The SAVI learning model can enhance students' cognitive abilities and retention of information. This approach is deemed a practical option for improving students' caliber of education and academic achievements. The model is notable for its emphasis on fostering student participation in learning, resulting in heightened motivation to learn and improved metacognitive abilities. Active student engagement in comprehending and utilizing provided information has enhanced problem-solving skills and improved academic achievement.

Consequently, utilizing the SAVI learning model may be a professional approach to augmenting students' learning processes and academic achievements. Implementing this model confers agency upon students, enabling them to participate actively in the learning process. This, in turn, leads to enhancements in their comprehension of the subject matter, problem-solving proficiencies, and overall academic accomplishments.

4. Conclusion

Based on the research and discussion results, it can be concluded that the Somatic Auditory Visualization Intellectually (SAVI) learning model is more effective in its application than conventional learning methods. This shows that somatic, auditory, and visual techniques can significantly improve students' learning and memory skills. The SAVI learning model provides students with a more interactive, fun, and memorable learning experience. Therefore, the SAVI learning model can be used as a more practical alternative to improving the quality of learning and student learning outcomes. Teachers can enhance their teaching skills by applying effective learning models, positively impacting students' academic growth. If conventional teaching methods are solely relied upon, students may not be able to develop their abilities fully and tend to become passive learners. The study results prove that the SAVI learning model is more effective than conventional methods. Therefore, educators should consider implementing the SAVI model in their teaching practices.

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