Education Quarterly Reviews

Mesterjon, Suwarni, Rulismi, D., & Supama. (2023). Evaluation of Demonstration Learning Models in Improving Vocational Student Learning Outcomes. *Education Quarterly Reviews*, 6(3), 173-180.

ISSN 2621-5799

DOI: 10.31014/aior.1993.06.03.772

The online version of this article can be found at:
https://www.asianinstituteofresearch.org/

Published by:
The Asian Institute of Research

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The Asian Institute of Research
Education Quarterly Reviews
Vol.6, No.3, 2023: 173-180
ISSN 2621-5799

DOI: 10.31014/aior.1993.06.03.772

Evaluation of Demonstration Learning Models in Improving Vocational Student Learning Outcomes

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Abstract
Technology 4.0 is currently developing rapidly, which has been used in various fields. One of them is as a tool in the field of education. The use of technology in the 4.0 era in learning is a necessity, including digital simulation learning. The use of Technology 4.0 in the world of education, especially in learning, will have an impact on the teaching and learning process to become more creative and competitive. Of course, in its implementation, it is necessary to evaluate the achievement of the learning model that has been implemented before. So this study aims to evaluate the application of demonstration learning models to improve student learning outcomes. The method used in this research is the method of observation, interviews, documentation with data collection techniques using questionnaires and observations, with a type of quantitative research. The population and sampling used in this study were teachers and students of Computer Engineering and Vocational High School (SMK) Network Engineering classes in Bengkulu with a focus on digital communication simulation lessons. Sampling data using several schools from the total sampling, the pattern of determining the sample by taking a number of samples determined randomly from a number of populations studied. Based on this, data samples were taken randomly from a number of teachers and a number of students from several schools. As well as data analysis using quantitative descriptive using the t-test. So, it was found from the results of the t-test showing the value of the questionnaire instrument, verified for the demonstration method (post-test) the average value (mean) is in the range of values of 33.27 and the standard deviation value (Std. Deviation) is in the range of 2.195. While the student interviews using the demonstration method (post-test) are in the range of an average value (mean) of 7.73 and a standard deviation value (Std. Deviation) is in the value range of 1.214. This shows that there is an effectiveness of the demonstration method on student learning outcomes in vocational high schools.

Keywords: Effectiveness, Demonstration Method, Student Learning Outcomes

1. Introduction

The development of learning methods in schools continues to progress alongside the rapid advancement of Technology 4.0, which has been widely adopted in various fields, including education. One of these methods is demonstration learning, which involves modeling and direct observation. In this approach, teachers demonstrate how to apply concepts or skills, while students observe and try them out. Evaluating the effectiveness of this

learning method is crucial in improving student learning outcomes in Vocational High Schools (SMK), considering their unique learning context. SMKs focus on practical skills relevant to the world of work, making it important to assess the demonstration learning model's impact on students' readiness for employment and overall learning achievements. This concept aligns with Mesterjon's (2021) proposal in the book "Theory and Concept of 4.0 Learning Management," stating that integrating Technology 4.0 in education, particularly in learning, enhances the teaching and learning process, fostering creativity and competitiveness. Consequently, the integration of technology in the 4.0 era, including digital simulation learning, becomes imperative.

This research employs the demonstration learning model 4.0 in the context of digital simulation learning. As noted by Sahempa (2021), the demonstration learning model utilizes visual aids to enhance students' comprehension and illustrate the steps involved in each learning process. Digital simulation learning serves as an effective tool, especially in the current technological era. The learning process encompasses three competency domains: cognitive, psychomotor, and affective. Assessing students' competence is pivotal in teaching and learning activities, as it determines their mastery of the material taught. Enhancing student learning outcomes is crucial to gauge the effectiveness of learning methods. Evaluating the demonstration learning model helps measure students' increased understanding, skill mastery, and practical abilities after engaging in this method. The evaluation results provide valuable insights for teachers and educational institutions, enabling them to optimize the use of demonstration methods in vocational learning contexts.

In addition, the assessment serves as a reference to measure the level of success and effectiveness in learning. This is in line with the statement by (Supriyono 2016), which emphasizes that learning must be easy, fun, and aligned with the teacher's expectations. Although the teacher dominates the classroom environment, achieving learning effectiveness requires strategies that are appropriate to the students' conditions. The state of the students plays an important role in achieving optimal results; thus, the right strategy is needed to meet the learning objectives. Therefore, teachers must utilize appropriate learning methods and media to maximize the learning objectives. Learning methods serve as tactics for conveying subject matter in a way that promotes student understanding, knowledge acquisition, utilization, and mastery.

This research focuses on evaluating the demonstration learning model, which is an important part of the ongoing educational research. The researcher hopes that by evaluating the demonstration learning method, researchers and educational practitioners can contribute stronger empirical evidence about its effectiveness. This will assist in evidence-based decision-making to improve the quality of education and student learning outcomes in SMK.

Furthermore, this study aims to measure the effectiveness of learning and help schools evaluate the extent to which the model is effective in delivering learning material to students. This involves measuring student progress, understanding concepts, and applying skills taught through demonstration learning models. The results of this study can also be used to assist schools in identifying the strengths and weaknesses of the model, including assessing the efficiency and effectiveness of the learning model, as well as identifying areas where the model needs improvement or adaptation.

2. Method

This research employed the Classroom Action Learning method approach, and the data was collected through observations and the use of a questionnaire. The learning model under study is the demonstration method, as proposed by Syaipul (2016). The demonstration method involves presenting lessons by demonstrating a particular process, situation, or object to students, either in reality or through imitation, accompanied by oral explanations. Similarly, according to Muhibbin (2017), the demonstration method is a teaching approach that involves demonstrating items, events, rules, and sequences of activities directly or using relevant teaching media. Arikunto (2016) also supports this view, stating that the demonstration method delivers material by showcasing a process or activity. Based on the opinions of these experts, it can be interpreted that the demonstration method is a teaching approach that involves demonstrating or displaying a method using relevant learning media for the presented material.

During the observation of several sampled schools, particularly in digital communication simulation classes, the researchers noticed that the demonstration method was commonly used. In these classes, students observed the teacher directly demonstrating the operation of the equipment used for learning. The implemented learning system raised initial suspicions of increased student learning achievement, which necessitated evaluation based on actual results. This suspicion arose because only a few students in the sample schools were able to complete practical assignments on time, while others faced difficulties, resulting in incomplete assignments. Ideally, learning should stimulate student creativity, promote active engagement, effectively achieve learning goals, and take place in a pleasant environment. Achieving such ideal learning conditions is only possible with the support of an ideal teacher. According to Suyono (2017), an ideal teacher possesses enthusiasm, motivates students, ensures that the conveyed material covers all discussion units, provides clear explanations, employs diverse teaching methods, instills hope in students, fosters accountability, accepts various inputs, supports students, and possesses effective classroom management techniques.

Therefore, this study aimed to evaluate the learning methods employed by observing the systematic teaching practices of the teachers. One of the teacher's efforts, during the researcher's investigation, was to directly demonstrate and present the BENIME 2D application menu, which specifically describes the subject matter related to simulation and digital communication. This approach aimed to capture the students' interest and enhance their understanding of the material through visual and auditory means. Digital Communication Simulation subjects equip students with the ability to communicate ideas or concepts using digital media. In this learning process, students can communicate and bring to life ideas or concepts presented by others through digital media. The hypothesis regarding these matters can be seen in the following figure:

The use of demonstration learning methods for student learning outcomes aims to foster students' interest and enthusiasm in the learning process. Employing the appropriate learning method greatly increases the chances of achieving the learning objectives to their fullest extent. By utilizing video-based demonstration methods in digital simulation subjects, one can identify the factors that hinder the learning process, thereby maximizing the learning outcomes. This aligns with the opinion of Mesterjon (2023), who suggests that different media and methods should be employed based on the specific needs and audience. Therefore, researchers need to assess the effectiveness of the research hypothesis, which is a crucial aspect to address research problems, and it can be validated through the collected data. The hypotheses for this study are as follows: (1) There is a possibility that the demonstration learning method is effective for improving student learning outcomes in simulation lessons and digital communication based on a sample of schools. (2) There is a possibility that the demonstration learning method is ineffective for improving student learning outcomes in simulation lessons and digital communication based on a sample of schools. To collect data, various instruments were employed, including observation, questionnaires, and documentation. These indicators were measured using the t-test and observation sheets. This research was conducted in multiple schools, with students from each school being selected as participants. The data for this study were obtained through questionnaires and multiple-choice question sheets to gather information regarding student learning outcomes.

3. Results and Discussion

Based on the findings of the study, it can be concluded that the utilization of the demonstration method in teaching has resulted in positive changes and has shown a tendency to enhance student learning outcomes in simulation and digital communication subjects. This conclusion is supported by the analysis of the multiple-choice question instrument administered to a sample of students from various schools. The test results are as follows:

Table 1: Results of Tests of Normality

Normaliti	**Kolmogorov- Smirnov**[2]			**Shapiro-Wilk**		
	Statistik	**‘df1**	**Sig**	**Statistik**	**‘df2**	**Sig.**
PreTest. Angket	0.172	Xxx	0.200	0.925	Xxx	0.358
PostTest Angket	0.122	Xxx	0.200	0.970	Xxx	0.891
PreTest Pilhan ganda	0.282	Xxx	0.014	0.882	Xxx	0.110

PostTest Pilhan ganda	0.234	Xxx	0.094	0.878	Xxx	0.097

The table above describes the results of the normality test conducted on student learning outcomes data (pre-test) and student learning outcomes data (post-test) using the Kolmogorov-Smirnov test. According to the table, the p-value (Sig.) for the observation questionnaire of student learning outcomes (pre-test) is 0.200, while the p-value (Sig.) for the multiple-choice questions of student learning outcomes (pre-test) is 0.014. Additionally, the p-value (Sig.) for the observation questionnaire of student learning outcomes (post-test) is 0.200, and the p-value (Sig.) for the multiple-choice questions of student learning outcomes (post-test) is 0.094.

Based on the distribution of the data, it can be observed that all the p-values are greater than 0.05. Therefore, it can be concluded that the data (pre-test and post-test) are normally distributed. This homogeneity test aims to determine whether the research data groups have the same variance or not, indicating whether the data sets have similar characteristics. The interpretation criteria for the homogeneity test using the SPSS program are as follows:

1. If the p-value is greater than>0.05, it indicates that the data variation is homogeneous.
2. If the p-value is less than>0.05, it suggests that the data variation is heterogeneous.

Table 2: Results of Tests of Homogeneity of Variances Questionnaire Instrument

Nilai	Levane Statistic	‘df1	‘df2	Sig.
Based on Mean	0.018	1	20	0.995
Based on Median	0.030	1	20	0.965
Based on Median and with adjusted df	0.030	1	19.943	0.965
Based on trimmed mean	0.014	1	20	0.907

The table above presents the results of the data homogeneity test conducted on the student learning outcomes questionnaire (pre-test) and the data on student learning outcomes during instruction (post-test). The data was analyzed using the Levene test (F test), yielding a p-value of 0.895. Since the p-value is greater than 0.05, it indicates that the data is homogeneously distributed.

Table 3: Results of Tests of Homogeneity of Variances of Multiple-Choice Questions

Nilai	Levane Statistic	‘df1	‘df2	Sig.
Based on Mean	0.032	1	20	0.859
Based on Median	0.000	1	20	1.000
Based on Median and with adjusted df	0.000	1	18.716	1.000
Based on trimmed mean	0.020	1	20	0.890

The data obtained from multiple choice questions was used to assess the learning outcomes of students before they were taught (pre-test), as well as the data on student learning outcomes after they were taught (post-test). The Levene test (F test) was conducted, resulting in a p-value of 0.859. Since both F tests yielded a p-value greater than 0.05, we can conclude that the data is statistically similar or homogeneous.

Table 4: Output results of the Paired Samples Statistics t-test

Instrumen Angket		Mean	N	Std. Deviation	Std Error Mean
Pair 1	PreTest	20.18	Xxx	2.089	0.630
	Post Test	33.27	Xxx	2.195	0.662

Based on the table above, it confirms the mean and standard deviation values for student learning outcomes before being taught (pre-test) and after being taught (post-test). The table indicates that the observed questionnaire yielded an average value of 20.18 and a standard deviation of 2.089 for student learning outcomes before being taught,

while the average value was 33.27 and the standard deviation was 2.195 for student learning outcomes after being taught.

Table 5: Output results of the Paired Samples Statistics t-test

Instrumen Angket		Mean	N	Std. Deviation	Std Error Mean
Pair 1	PreTest	2.55	Xxx	1.214	0.366
	Post Test	7.73	Xxx	1.105	0.333

According to the t-test table above, it can be observed that the multiple choice questions yielded an average value (mean) of 2.55 and a standard deviation (Std. Deviation) of 1.214 for student learning outcomes in the pre-test. In contrast, the average value (mean) for student learning outcomes in the post-test was 7.73, with a standard deviation (Std. Deviation) of 1.104.

Table 6: Results of Paired Samples Correlations

Instrumen Angket	N	Correlation	Significance	
			One-Sided p	Two-Sided p
Pre Test & Post Test	Xxx	0.948	< 001	< 001

The table above presents the results of the independent samples t-test, which examines the average difference between student learning outcomes (pre-test) and student learning outcomes (post-test). The independent samples t-test is appropriate for this analysis because the data for both the pre-test and post-test are normally distributed. Based on the table, it can be observed that the independent samples t-test (t) value for the data obtained from the questionnaire instrument is 0.948, with a corresponding p-value of 0,001.

Table 7: Results of Paired Samples Correlations

Instrumen pilihan ganda	N	Correlation	Significance	
			One-Sided p	Two-Sided p
Pre Test & Post Test	Xxx	0.943	< 001	< 001

In the table above, the data obtained from the multiple-choice questions shows a value of 0.943 with a p-value of 0.001. Since the p-value is less than 0.05, it indicates a significant difference between student learning outcomes (pre-test) and student learning outcomes (post-test), suggesting an average difference.

Table 8: Paired Samples Test Results

Data Instrumen Dw					T	Df	Significance	
Mean	Std Deviation	Std Error Mean	Confidence Interval of the Difference				One Sided p	Two Sided p
			Lower	Upper				
-14.092	0.701	0.211	13.562	12.620	61.965	10	< 001	< 001

The table above illustrates the results of the paired samples t-test conducted to compare student learning outcomes (pre-test) and student learning outcomes (post-test). According to the table, the standard deviation value (Std. Deviation) for the questionnaire instrument data is 0.701, and the corresponding p-value is 0.001.

Table 9: Paired Samples Test Results

Data Instrumen Dwj					T	Df	Significance	
Mean	Std Deviation	Std Error Mean	Confidence Interval of the Difference				One Sided p	Two Sided p
			Lower	Upper				
-6.293	0.406	0.22	0.3.454	0.4.910	42.485	10	< 001	< 001

Meanwhile, according to the table of multiplechoice questions, the standard deviation value (Std. Deviation) is 0.405, and the corresponding p-value is 0.001. Since both the questionnaire instrument data and multiplechoice questions have a p-value less than 0.05, it can be concluded that there is a significant average difference between student learning outcomes (pre-test) and (post-test).

Based on the research results and hypothesis testing, the discussion in this study can be described in more detail. The hypothesis suggests that there is an effectiveness between the use of demonstration methods to increase student learning outcomes. The results indicate an increase in learning completeness when using the demonstration method. This is supported by the average value of student learning outcomes (post-test) for the questionnaire instrument, which was 33.27, and the value of the multiple-choice questions, which was 7.73. In contrast, the average value for the broad-scale lecture method (pre-test) was 20.18 for the questionnaire instrument and 2.55 for the multiple-choice questions.

In the digital simulation subjects, the pre-test results using an observation questionnaire instrument showed that all students sampled from schools in the medium category had a percentage range of 42.5% - 57.5%. In the post-test, three students achieved the sufficient category, with a percentage range of 75% - 77.5%. Additionally, several student samples fell into the high category, with a percentage range of 80% - 92.5%. The data obtained using multiple-choice questions in the pre-test showed that some student samples fell into the very low category (0% - 10%), some into the low category (20% - 30%), some into the sufficient category (40% - 50%), and in the post-test, some sample students achieved the sufficient category (60% - 70%), while others reached the high category (80% - 90%). Furthermore, in the subsequent test (pre-test), both the questionnaire instrument and multiple-choice questions were given to the students. It was observed that students answered the questionnaire instrument and multiple-choice questions by guessing and to the best of their knowledge. Similarly, in the post-test using the demonstration method, students were once again given questionnaires and multiple-choice questions, which yielded better results compared to the previous method (pre-test). This can be attributed to the fact that the demonstration method allows students to directly observe and participate in the learning process. In line with Arikunto's statement (2016: 197), the demonstration method is an effective way of delivering material by demonstrating a process or activity. The data processing using SPSS aligns with the research conducted by Mesterjon (2022), who stated that the demonstration method applied to the experimental class significantly affects student learning outcomes.

4. Conclusion

Based on the research results, it can be concluded that the evaluation of the application of the demonstration learning model 4.0 to digital simulation learning in grade 10 students was conducted through sample trials. The results obtained from a number of student samples fell into the sufficient category, ranging from 60% to 70%, while a number of students achieved high scores, ranging from 80% to 90%. Therefore, it can be inferred that the application of the demonstration learning model 4.0 to digital simulation learning has a positive impact on student learning outcomes. The utilization of this model can assist schools and educators in enhancing student achievement and improving school accreditation.

Acknowledgment

This research was funded in part by the Dehasen Foundation and the Bengkulu Provincial Education Office.

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