

PROCEEDINGS
**4th International Conference on Technical
and Vocational Education and Training (TVET)**

Theme:
**Technical and Vocational Education and Training
for Sustainable Societies**

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4th International Conference on Technical and Vocational Education and Training (TVET)

Theme: Technical and Vocational Education and Training for Sustainable Societies

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FOREWORD

Welcome for all respected scholars, researchers, post graduate students and especially Keynote Speakers to the 4 ICTVET. The theme of the conference focus on Technical and Vocational Education and Training for sustainable societies and consist of six subthemes. i.e Development of learning model on TVET, Workplace Learning and entrepreneurship, Innovation on applied engineering and information technology, Management and Leadership on TVET, Vocational and Technical Teachers education, and Assessment and Evaluation on TVET.

Sustainable society should be followed by the improvement of various factors that have impacts to the quality of vocational and technical education and training, particularly to overcome the competitiveness of the world business. As we have already known the rapid change of technology as well as the change of demography, having a great effects to the life of peoples in this world, The competitiveness need a collaborativeness to survive the life of millions peoples who lost their jobs. Young peoples as a productive generation have to be creative and innovative to face the competitiveness. So this proceeding contents consist of various findings of research in the field of vocational and technical education as well as applied technology and mainly based on the subthemes of the conference.

Finally, we would like to thank a million for all participants of this conference and all parties who support the success of this conference. Hopefully the seminars and scientific work of this seminar can be a reference material for basic education and elementary school teacher education in Indonesia.

Padang, July 2, 2018

Tim Editor

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IMPLEMENTATION OF CONTEXTUAL TEACHING AND LEARNING ON ANALYZING ELECTRICAL CIRCUITS SUBJECT

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ABSTRACT: This research is established based on one of the factors that creates the low percentage of student's learning completeness in the subject of Analyzing Electric Circuit. The intended factor is the learning model. This research is conducted in SMK N 1 Pariaman by applying one of the learning models that is the Contextual Teaching and Learning model to observe its effect in student's learning outcomes. This model contains some components that can emphasize students to be more active and participate. The purpose of this research is to determine the improvement of student's learning outcomes in the subject of Analyzing Electric Circuits by implementing Contextual Teaching and Learning model. The type of this research is Quasi Experiment with pretest-posttest one group design and the instruments used to see the results of the applied model are pre-test and post-test. Those instruments must be tested for validity, reliability, differentiation, and difficulty before being used. The results obtained from this research are included into the medium category to improve the student's learning outcomes after implementing the Contextual Teaching and Learning model.

Keywords: *contextual teaching and learning, learning outcomes*

1. INTRODUCTION

Education is a deliberate and well-planned effort to help the student's potential and ability developments to be useful for their life as an individual and a citizen in a society in the future and it must touch their potential of conscience and competence. The concept of education will be more important when they have to enter a life in the society and work environment. This concept is similar to the concept applied in Vocational High School. The students are expected to be able to implement what they have learned in the school to face the problems in their daily life. The Vocational High School is a secondary school that produces graduated students who have certain skills to work in business and industry area.

The students are being the object that determine the school's success performance in educational process. The school's successfulness in teaching their students is determined by the results of students' learning outcomes obtained during the study process. There are many components that could be one of the factor to acquire these results. The first one is the difficulty level of the subject learned by student. Each subject has the different level of difficulty and it requires the proper techniques and methods. The second one is the teacher's role to manage all study process in the school. The third one is the applied learning model used to ensure those process is working well and optimally.

Based on the observation results at grade X

TITL of SMKN 1 Pariaman, the study process is still centered and depend on the teachers. The teachers stand in front of students to explain and deliver all the subject matter content with the speech method without involving students to be more active during the study process. This method resulted students accustomed to come, sit, listen, make a note, and memorize the subject material without trying to get more information about it. The study process also tends to focus only in particular subject. The students's learning outcomes are assessed only based on academic exam activities such as midterm and final exam. The assessment is supposed to include all the student's involvement in studying activities such as the attainments, recording appearance, daily test, etc. As a result of this learning method is the students tend to do things that can interfere the study process during the class such as bothering their friends, playing with their phone, sleeping, etc. Moreover, the students are not able to implement the subject content that they have learned in daily life, stuttering to their own problem because they are not accustomed to think critically and working in a team during the class. This kind of learning model is still found in the studying process for the subject Electrical Circuit Analysis.

Electrical Circuit Analysis is a subject that learn about how to describe the basic concept of electrical circuit, analyze AC and DC circuit and also magnetism circuit. It is one of subjects that educate, train, and prepare the students to

understand the concept of electrical circuit in field of electricity.

Based on the observation results conducted in SMKN 1 Pariaman, some students' scores are still below minimum passing criteria (Kriteria Ketuntasan Minimum / KKM) established by school, which is 75 in range of 0 – 100. There are 67.1 % of students obtain the scores below KKM and 32.9 % above KKM for the subject of Electrical Circuit Analysis. That scores indicate that the percentage of students' learning outcomes is considered as low criteria since more than 50 % of students' scores are below 50 %. It is occurred due to the incompatibility of learning process during the class.

Learning outcomes can be seen as an indicator of students' fruitfulness at school. These results can be used as a reference or consideration to determine the students' ability. The participation of many parties is required to improve student learning outcomes associated with their efforts to improve the quality of education. Besides, an optimal approach is also needed to achieve the desired learning outcomes for the subject of Electrical Circuit Analysis therefore students really want to study hard and has deep understanding.

One of the teacher's efforts to improve students' understanding and learning outcomes in this subject is by applying a learning model that is integrated with the students' daily context. This model will produce a basic deep knowledge where they could understand the problem and the way to solve it. The students are able to use their knowledge independently to solve new and unprecedented problems and have more responsibilities to learn as their experiences and knowledges improvement. Meanwhile, the teachers have more important roles as communicator, motivator and facilitator to create successful students. All the efforts are established to improve the students' learning outcomes in a better way therefore they can get the scores according to KKM.

The objective of Electrical Circuit Analysis has not been achieved as expected due to the low percentage of student's learning outcomes in this subject. The roles from various education aspect especially teachers are highly required to achieve this purpose. Teachers are expected to implement varied learning model. One of innovative learning model could be implemented is Contextual teaching and Learning model.

2. CONTEXTUAL TEACHING AND LEARNING

Contextual Teaching and Learning (CTL) is a comprehensive system that consist of some parts which are connected to each other. This system

generates the overwhelming effects that can exceed the results given by separate parts. Like the features of violin, cello, clarinet, and other musical instruments in an orchestra, they produce different sound each other but these sounds will perform a music with good combination and harmony, as well as the separate parts of CTL that involves different process. When it is used together, it enables students to create the meaningful relationship. Every different part of CTL gives contribution to help the students to figure out the assignment given by teacher and it forms a system that allows the students to see the meaning of it and recall the academic material [8].

CTL model is a strategy that fully involves students in learning process, they are encouraged to learn the subject material according to the topic to be studied. In the context of CTL, students are not only sitting quietly, listening, and writing notes but also they have to be more active and take part in teaching and learning process and also experience it directly. Therefore the students' development is completely occurred through this process not only in cognitive aspect but also in affective and psychomotor aspects. Furthermore, students are also expected to find and prepare the subject matter content themselves.

2.1 Characteristics of Contextual Learning

Johnson [8] said that a CTL system consist of eight components that become the characteristics in contextual learning as follows:

- a. Making meaningful connection.
- b. Doing significant work.
- c. Self – regulated learning.
- d. Collaborating.
- e. Critical and creative thinking.
- f. Helping the individual to grow up and develop.
- g. Reaching high standard.
- h. Using authentic assesment

2.2 Contextual Learning Components

Rusman [7] stated that CTL is characterized by seven components as follow,

2.2.1 Constructivism

Constructivism is cornerstone of thought (philosophy) in CTL which stated that the knowledge built by human gradually and the result are expanded through limited context.

2.2.2 Inquiry

Inquiry is a main activity of CTL through the discovery effort. It affirms that the necessary knowledge, skills and other abilities are not the result of remembering a number of facts but they are the result of own discovery.

2.2.3 Questioning

Implementing of questioning elements in CTL must be facilitated by teachers. The students' habit to ask the question and the teacher's ability to answer the question will improve the learning quality and productivity.

2.2.4 LearningCommunity

The purpose of the learning community is to get the students to work together and utilize the learning resources from their study group.

2.2.5 Modeling

The stage of model construction can be used as an alternative to develop the learning process therefor the students can meet their expectation thoroughly and help them to overcome the teacher's limitation.

2.2.6 Reflection

Reflection is the ways of thinking about what the students have learned and thinking about what they have done in the past. In this case, the students put forward what they have learned as a new knowledge structure either in the form of enrichment or revision of prior knowledges. In the reflection moment, the students are given the opportunity to consider, compare, understand, and perform the discussion with themselves (learning to be).

2.2.7 AuthenticAssesment

The assessment is an integral part of learning that has the crucial function to gain the information from learning process through the implementation of CTL. This is the process of collecting various data and information that can provide an overview of the students' learning experiences. The assessment is done in authentic form in order to reduce the students do copy paste to the other friends' work. Assessment is authentic when teachers direct examine student performance on worthy intellectual task.

2.3 Advantages and Disadvantages of Contextual Teaching and Learning Model

This model has several advantages [7], such as:

1. It can develop student thinking to perform meaningful learning activity.
2. Students can study, discover, and construct their new knowledges and skills by themselves.
3. It can carry out as far as possible the inquiry activity for all topics being taught.
4. It can develop students' curiosity through raising questions.
5. It creates learning community such as discussion group, question and answer, etc.
6. It presents the model as an example of learning. It can be illustrations, model, and actual media.
7. To familiarize the students to do the reflection in every learning activity that has been done.
8. Doing the objective assessment such as evaluating the actual students' abilities.
9. Inventing the new things from learning outcomes.

Besides, there are several disadvantages of Context Teaching and Learning [7], such as:

1. Students with though disorder (having some problem in the way of thinking) will be difficult to follow this kind of learning model.
2. The teacher must understand the subject matter content very well because it can be a burden when the students discover the new things related to the subject during the learning process and it also can lead a mistake to determine the learning outcomes.

3. MAIN RESULT

The data used in this research is the result of the learning outcomes for the subject of Electrical Circuit Analysis in grade X TITL 2 in SMKN Pariaman. Prelimenary data is obtained based on the result of pre-test of 34 students. The students' scores for this test are around 56 – 80. Then for the final data, all students are given by post – test after they receive the learning process by using the Contextual teaching and Learning model. The students' scores are increased into 68-92.

Table 1 and 2 below show the summary of scores and distribution of frequency data obtained from this research.

Table 1. The summary of the highest score , the lowest score , mean score and standard deviation of pre – test and post - test

	The highest score	The lowest score	\bar{X}	N	S
Pre-test	80	56	68.91		5.67
Post-test	92	68	83.26	34	6.01

Table 2. Frequency distribution of pre-test and post-test

Range of scores	Frequency of Pre-test	Frequency of Post-test
56	2	1
60	4	3
64	6	5
68	12	6
72	6	12
76	3	4
80	1	3
The total	34	34
Mean	68.91	83.26
Standard	5.67	6,01

From the tables above, it can be seen that most frequencies for the pre – test result achieved by students are in the interval 68-71. The result indicates that many students have not reached the minimum passing criteria of studying. Meanwhile, students achieve most frequencies for the post-test results in interval of 84-87. It shows that there is an improvement of learning outcomes after applying the CTL model.

3.1 Normality Test

Normally test is conducted to see if the data from class that being the subject of the observation is distributed normally. This test uses chi-squared method with the manual calculation. The result is obtained from the value comparison of $\chi^2_{calculation} < \chi^2_{table}$ on the research subject with the significant level is $\alpha = 0.05$ and the degree of freedom is 6.

Table 3. The result of Normality test for pre-test and post-test

	N	$\chi^2_{calculation}$	χ^2_{table}	D
Pre-test	34	3.56	12,59	Normal
Post-	34	2.34	12,59	Normal

3.2 Improvement of Learning Outcomes

The learning outcomes of Electrical Circuit Analysis is achieved after implementing the *Contextual Teaching and Learning* model that can make students be more active and participate in the learning process. In overall, this model is successfully implemented to 34 students by conducting pre-test and post-test. Based on the data analysis by using Gain scores, the scores are increased by 0.462. Therefore, it can be explained that the learning outcomes of this model has the improvement in medium category.

From the above explanation, it can be concluded that the learning process by using the Contextual teaching and learning model can improve students' learning outcomes because there is significant improvement of learning outcomes between pre-test and post-test.

4 CONCLUSION

Based on data analysis and discussion above, it can be concluded that Contextual teaching and learning model can improve the students' learning outcomes in every meeting for the subject of Electrical Circuit Analysis in SMK Negeri 1 Pariaman. This model is conducted by applying two kind of test to compare the result, pre–test and post-test. The result of pre-test is obtained before CTL is applied and the mean score for this test is 68.91 while post-test is obtained after CTL is applied and the mean score of this test is 83.26. By using the Gain Score test, we get the improvement of learning outcome by 0.462 and it can be included into medium category.

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Drafting the article : All authors

Final approval of the version to be submitted : All authors

9 ETHICS

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.