

# Development Model of the Contextual Project-Based Electrical Lighting Installation Learning at Indonesian Vocational High School

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**Article Info**

**Volume 82**

**Page Number: 16388 - 16393**

**Publication Issue:**

**January-February 2020**

**Abstract:**

This study aims (1) to find a Contextual Project Based Learning learning model in learning electric lighting installations, (2) to create a valid, practical and effective Contextual Project Based Learning learning model in installing electric lighting installations. This study uses Research and Development with the Borg and Gall procedure. Qualitative data was collected through observation and interviews, while quantitative was collected through questionnaires, both data collection tools were validated by experts in the FGD (Focus Group Discussion). Research, Development and Refraction of the FGD obtained research data collection instruments to test whether the instructional model developed is valid, effective and practical in learning electrical lighting installations. A number of students involved in this study formed a class that was given treatment using a Contextual Project-Based Learning model. The results of this study are Contextual Project Based Learning (CPjBL) models in learning electric lighting installations in Vocational High School that are valid, practical and effective that have been validated by experts with positive responses from teachers and students.

**Article History**

**Article Received:** 18 May 2019

**Revised:** 14 July 2019

**Accepted:** 22 December 2019

**Publication:** 28 February 2020

**Keywords:** *Research and Development, Contextual Project Based Learning Model, Electric Lighting Installation*

## INTRODUCTION

The fundamental problems faced by Indonesian education are reflected in the reality of education carried out in the context of models and learning strategies in high schools, most of the teaching staff are less creative, less innovative because they still

success in achieving academic success[2]. Teachers are a noble profession, specifically educated and become role models of society and imitated by their students, and are able to become an authoritative figure in educating their nation[3].

understand conservative and traditional models and strategies[1]. Teachers should read the conditions of dynamic times so that the output of education already has an independent mentality, thinking must be critical and creative which is the key to

Learning in Vocational High School (SMK) requires students' academic skills (Hard Skills) and also demands personal skills (Soft Skills) ready to enter the workforce after completing engineering education can provide theories of problem-solving that

occur in real projects using learning strategies in the field of engineering[2]. Weaknesses in the learning process associated with learning problems include teacher-centred pedagogy, lack of variation in learning, not paying attention to the diversity of students' potentials, evaluation methods are merely testing memories[4]. One method, which directs pedagogical technology towards interactive learning, includes project preparation and presentation, namely project-based learning. Project-based learning in self-development for general competencies and learner subjects has been widely recognized[5].

Project-based learning is often said to promote students' intellectual and social development because it requires them to actively participate in the process of gaining knowledge and skills with limited teacher supervision.[6]. Project-Based Learning is a learning model based on the principle of using problems as a starting point for gaining new knowledge. The effectiveness of this model is centred on the use of problems that create learning through new experiences, obtaining new information, obtaining new information and reinforcing existing knowledge[7]. Project-Based Learning Model as learning process-oriented to student learning processes, Project-Based Learning is strongly influenced by student and teacher authority in intellectual interaction. The interaction between student and teacher authority is a very important component in the Project-Based Learning model[8]. Therefore, the success of project-based learning depends on the ability and willingness of students to take the initiative and make decisions.

Whereas contextual teaching-learning is a learning concept that can help teachers link between the material being taught with the real-world situation of students and encourage students to make connections between the knowledge they have and its application in their lives as a family and

community members.[9]. Contextual can involve students in selecting, organizing and integrating information and motivating them to apply the knowledge acquired to solve the challenges given[11].

Therefore, one learning strategy that can help students to have creativity in thinking, problem-solving, and interaction as well as assisting in investigations that lead to solving real problems is Contextual and project-based learning. Operationally, the objectives of this study are (1) Finding a Contextual Project Based Learning learning model in learning electric lighting installations, and (2) creating a valid, practical and effective Contextual Project Based Learning learning model in installing electric lighting installations.

## **METHOD**

### **Research Subjects**

The implementation of the CPJBL (Contextual Project Based Learning) model trial place is conducted at the Vocational School of Electricity Engineering, namely SMKN 5 Padang West Sumatra, the subject of the CPJBL (Contextual Project Based Learning) research pilot location for electrical lighting installation is divided according to the planned trial stages, namely (1) Expert Trial Subjects (Experts) for constructs and content (2) Limited Trial Subjects (3) Expanded Trial Subjects.

### **Data Collection Instrument**

The tool used to collect data in research by measuring and is a written guideline in the form of a list of statements that have been prepared to obtain information from respondents is done by means of observation documentation and questionnaires to teachers and students in accordance with the development goals for obtain data in research used in the form of a variety of data collection techniques, namely (1) Documentation Study, (2) Expert Judgment, (3) Questionnaire, (4) Observation Sheet. While the research data analysis techniques

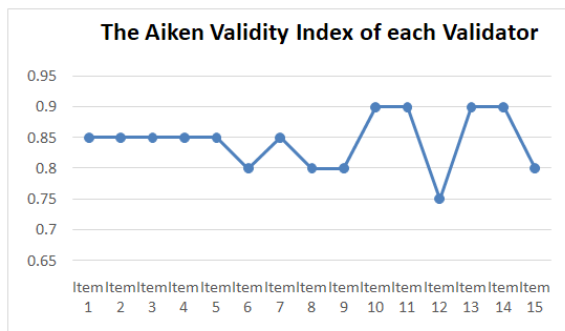
for the development of CPjBL (Contextual Project Based Learning) models for vocational installations of electric lighting use qualitative and quantitative descriptive analysis techniques.

### Data Analysis Techniques

Research data analysis techniques for developing CPjBL (Contextual Project Based Learning) vocational installations of electric lighting using qualitative and quantitative descriptive analysis techniques. These two data techniques are closely related to the stages of developing CPjBL (Contextual Project Based Learning) learning starting from the problem formulation of the problem, research objectives, research model, type of data, number of subjects and theoretical assumptions used. This data analysis stage consists of (1) design validity, (2) practicality, and (3) effectivity.

### RESULT AND DISCUSSION

The assessment or validation of CPjBL learning model in electrical lighting installation learning is validated by four experts or validators by considering some aspects, they are: (1) Content Appropriateness; (2) Construction; and also (3) Language. Those things can be seen on figure 1 below:

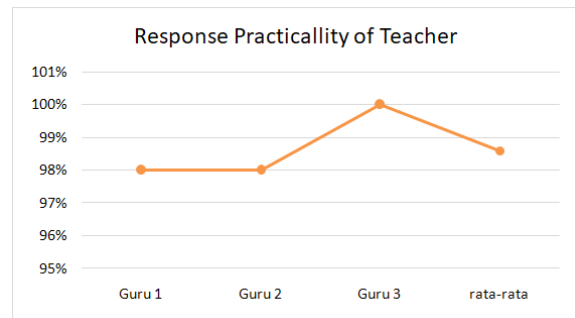


**Figure 1. Model Validation Assessment of electrical lighting installation learning by using CPjBL Model**

Figure 1 test results of the model validity of learning outcomes of electric lighting installation subjects are valid, it can be seen

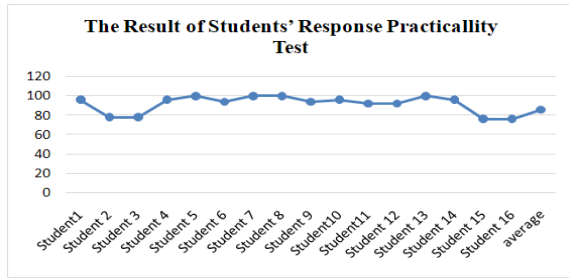
from the analysis of the data obtained Aikens V value of 0.84 results from the calculation of Aikens 0 to 1 and the number 0.600 can be interpreted to have a high enough coefficient of V value of  $0.84 \geq .600$  is stated in the valid category and is suitable for use[12]. After the research instruments are validated and the results are declared valid, then the next step to do is the practicality test.

Test the practicality of teachers' responses to the CPjBL model in learning electric lighting installations in Vocational Schools on aspects of (1) Attractiveness, (2) ease of use, (3) functioning and usefulness, (4) rehabilitation, (5) sufficient time, and (6) level of difficulty in implementing. The following description of the results of practicality tests conducted by teachers and students who have done learning using the CPjBL model in installing electrical installations at SMK can be seen in Figure 2.



**Figure 2. Response Practicallity of Teacher to CPjBL Modeling Electrical Lighting Installation Learning at Vocational High School**

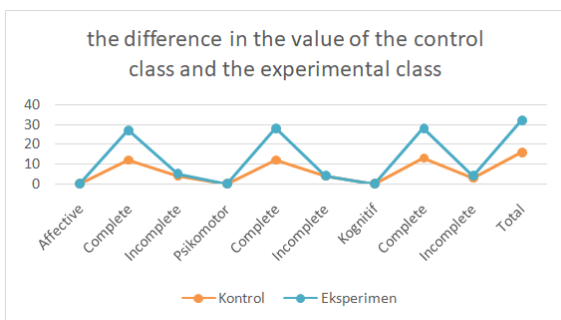
The average value of the practicality test  $\geq 85\%$  proves that the teacher strongly supports the development of the CPjBL model in learning electrical installations. The results of the practice tests of students' responses to the CPjBL model in learning electric lighting installations in Vocational High Schools in aspects (1) learning conditions, (2) ease of use, (3) increase student effectiveness, and (4) independence, All aspects can be seen in Figure 3 below.



**Figure 3. The Result of Students' Response Practicality Test to the CPjBL Model in Electrical Lighting Installation Learning at Vocational High School**

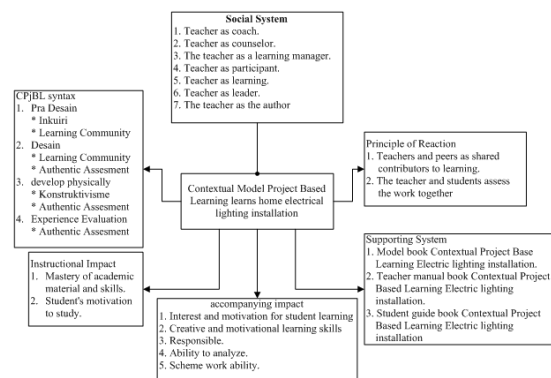
Practicality Test Results Student Responses to the CPjBL Model in Learning Electrical Lighting Installation in Vocational High Schools is considered practical if it has a practical value  $\geq 80\%$  and is impractical if it has a practical value  $<80\%$  [13]. Based on the results of the picture above, it can be seen that the average value of a practice is 85.6% with very practical criteria.

The effectiveness test can be seen from the learning outcomes using the CPJBL learning model (Contextual Project Based Learning) of vocational electric lighting installations. Learning outcomes are obtained by giving a test to students who have been given a learning treatment model of CPjBL (Contextual Project Based Learning) whose class is called the control class, test questions in the form of objective tests, multiple-choice. Analysis of the value of the control class and the experimental class from the psychomotor and cognitive-affective aspects can be seen in the following figure.



**Figure 4. Analysis of control class and experimental class data**

Based on the analysis of the data above, it can be seen the difference in the amount of completeness of the experimental class scores more than the control class viewed from the affective, psychomotor, and cognitive aspects. The CPjBL Syntax Analysis in this study is a syntax that is combined from the Contextual syntax and project based learning to be used in the installation of electric lighting installations in order to ensure that student learning is carried out properly, the form is as follows:



**Figure 5. CPjBL Model in Learning Electrical Installations**

This study found a CPjBL model in the installation of electrical installations in SMK. In research into the development of the CPjBL model in installation learning at the designed vocational high schools, it has been tested on students studying in class XI. The population of this study consisted of 36 people with 16 details for product trials and the remainder for instrument trials.

This study aims to develop a Contextual Project Based Learning model in Vocational High Schools and find out whether the developed model is valid, practical and effective. The validation of the product development model is done through the validation of the experts (expert judgment) test the practicality of the model through the response of students and teachers who are subject to electrical lighting installation subjects and test effectiveness through the test results given at the end of the meeting

variable in research there are two namely CPjBL models in learning as independent variable and learning outcomes as the dependent variable.

To produce CPjBL model products in the installation of SMK Electrical Installations, several procedures for developing learning models have been carried out that refer to the Borg and Gall development models [14] which has been simplified into 5 steps by the central team of policy research and education innovation [15]. Reasons to choose the Borg Gall procedural model in development because this model is one of the learning design models that involves simple and easily operationalized, systematic, practical design stages so that it is more relevant to be used as a reference in developing learning models.

In this study, three stages were carried out, namely (1) Conceptual Model (2) Mortgage Model (3) Final Model. Conceptual Model means a model built based on the theoretical study of research results elsewhere needs analysis of field observations identifying the needs of students in mortgages is a model that has been validated by experts and practitioners Focus Group Discussion, the final model is a model that has been empirically tested so that the Contextual Project model Based Learning is valid, practical and effective.

The first step taken by the researcher is to look at the learning outcomes of students from two classes on cognitive, psychomotor and affective aspects by analyzing students' needs through a questionnaire. Both designs at this stage are carried out to formulate the learning objectives of specific, measurable, applicable and realistic electric lighting installations. Next, compile the test, determine the appropriate learning strategies and learning media, consider supporting sources, relevant learning resources, what kind of environment should be made and others. The third development is the process of realizing the results of the development

design is the third step in implementing the Borg and Gall procedural learning system design model [14]. development steps include the activities of making, buying and modifying teaching materials. Development in research includes choosing activities to methods, media and learning strategies to be used in delivering material or substance of the program at the product development stage of the CPjBL model in the installation of SMK electrical installations that are made so that the resulting product is valid, practical and effective. In the expert validation and revision stages, the researcher revises the product design by perfecting the development of products that have been developed and tested on a small scale based on the input obtained. After it is tested, it is revised again. Fourth, product implementation, large-scale trials. Products that are revised back to the development process are then tested on an expanded scale. The results of the trial on an expanded scale serve as the final evaluation material of the product. The five evaluations are carried out thoroughly and if necessary, revisions are made so that the products developed become better. The evaluation and revision stages of this product are the results of the research and development of the CPjBL model in learning electric lighting installations at SMK.

## CONCLUSION

Based on the research results of the development of the Contextual Project Based Learning learning model in the learning of electrical lighting installations in Vocational High School, the following conclusions can be drawn: (1) this study has found a Contextual Project Based Learning (CPjBL) model in learning Vocational High School Electric Lighting Installation with the syntax (a) Pre Design (b) Design (c) Build Architecture (d) Evaluate Experience; (2) this research has produced a Contextual Project Based Learning (CPjBL) model in learning electric lighting installations in valid, practical and effective Vocational High School which have been validated by experts

with a mean score of V above 0.84 with valid category values with positive responses from teachers and students. Teacher questionnaire results are 98.6% and student responses 85.6% with a very practical category produced a Contextual Project Based Learning (CPjBL) model in effective Vocational High School electrical lighting learning that can be seen from a comparison of student learning outcomes Control Class and Experiment class shows that there are significant differences.

### ACKNOWLEDGMENT

The researchers want to say thank you to every people who helped the researcher in doing this research. Special thanks to Indonesian Endowment Fund for Education (LPDP) for giving full funding and scholarship for Hermansyah to study at Applied Vocational Education dan Technology Program, Graduated School Program, Universitas Negeri Yogyakarta.

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