

Project Based Learning as Settlement of Sub netting Materials In The Study of Network Design

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Abstract. This research intended to improve students' learning results in solving problems on Subnetting materials by using learning modules. The research method used experiments with True Experimental Design in the form of Post-test Only Control Design. This method uses two randomly selected groups to be a control group and an experimental group. The control group was not given treatment, while the experimental group was given treatment. After giving treatment both groups will be given the posttest to know the learning result from each group. Based on the research findings obtained from the hypothesis test, the average value learning control class is 69.88 and the experimental class is 84.90. So it can be concluded that the result of Subnetting material problem solving by using Project Based Learning module gets higher learning from those not using Project Based Learning module.

1. Introduction

The learning model is one of the important components that support the success of the learning process. The accuracy of the selection of learning models will have an impact on the success of student learning and the achievement of learning objectives. The learning model is a learning design that is designed to facilitate the learning process [1].

One of the efforts made to overcome this problem is to implement a learning model project-based learning. This is in line with what Sani revealed [2] is a learning model that is in accordance with the scientific approach used in the 2013 curriculum, namely inquiry-based learning, discovery learning, problem-based learning, and project-based learning. Project-based learning is a learning model that provides flexibility to students for creativity in accordance with their abilities. The learning process begins with the observation and assignment of the network design concept, then the students work carefully according to the chosen theme. Based on the background above, the author formulates the problem as follows: (1) How is the feasibility of the learning module with project-based learning in solving the problem of material sub-netting on Network Design subjects ?; (2) Can learning modules with project-based learning improve student learning outcomes in solving material problems sub-netting compared to conventional learning

2. Method

In this study, the approach used in research is a quantitative approach. The design used in the study was a design with an experimental method. The design used in the experimental research is True Experimental Design in the form of Post-test Only Control Design. The group to be studied consisted

of the control class (not given treatment) and the experimental class (given treatment). Determination of the two groups was chosen randomly. The shape of the design of this study shown in Table.

Table 1. *Posttest-Only Control Group Design*

<i>Treatment Group</i>	X	O
<i>Control Group</i>	C	O

Notes:

X: treatment using *project-based learning*

C: treatment using a conventional method

O: student learning outcomes(posttest)

1.1. Data analysis technique

This study uses data analysis techniques as follows: 1) At the stage of project preparation, educators design identification of learning needs that contain the theme of the project, project design, and resource management. Then educators guide students in choosing the theme of the project whose problem will be solved. So that students can determine the planning of project activities that are monitored by educators; 2) The implementation phase of the project has three stages carried out by the participants, including exploration, discussion, work. Students are given the opportunity to explore the concept of the chosen theme, then discuss it with members in the group before carrying out the process; 3) The project completion phase, students do finishing by making a report which is then presented to the educator. After that, educators evaluate all processes of the student project based on participation and productivity in construction; 4) The data analysis technique is very concerned with the calculation to answer the problem formulation and test the proposed hypothesis. The following data analysis techniques used in this study include: (1) validation assessment obtained from the validation sheet assessed by validators who are experts in their fields, then the assessment is processed and conclusions are drawn by adjusting the interpretation of the size of the validation assessment; (2) analysis of items from the posttest which will be known validity, level of difficulty, and reliability by using Anates v4; (3) learning outcomes test is obtained by giving posttest to students after being given treatment or not given, then the data is analyzed to determine the normality test, homogeneity test, and hypothesis test

3. Results and Discussion

The research design used in this study is True Experimental Design in the form of Posttest-Only Control Design. This design divides the sample into two groups, namely the experimental group and the control group. Learning in the experimental group used the Project Based Learning. The sample used in the study was class XI TKJ 1 as the control group and class XI TKJ 2 as the experimental group.

3.1 RPP Validation Assessment

Results Obtained RPP validation results with an average value of 83.85%. If seen from table 3.6 regarding the interpretation of the size of the validation assessment with the average included in the Very Valid assessment criteria.

3.2. Results of Validation Assessment of Material

Obtained results of material validation with an average value of 81.23%. If seen from table 3.6 (Riduwan, 2013: 94) regarding the interpretation of the size of the validation assessment with the average included in the Very Valid assessment criteria.

No	Instrument Research	Results of Rating (%)	Category	Information
1	RPP	83.85%	Very Valid	Eligible
2	Material	81.23%	Very Valid	Eligible
3	Sheets Assessment Project	80.00%	Valid	Eligible
4	Instruments Test	84.10%	Very Valid	Eligible

From the results of the data in Table 2 that the validity value of RPP instruments is 83 , 85% is in the very valid category, the value of the validity of the material instrument is 81.23% which is in the very valid category, the value of the instrument validity of the project assessment sheet is 80.00% which is in the valid category, the validity value of the test instrument is 84.10% in the very valid category. So that it can be concluded that the instrument of this study was declared feasible for research at Vocational High School (SMK Negeri 2 Surabaya). Data from item analysis results that were performed using Anates v4 software can be summarized in Table 3.

Table 3. Recapitulation of Anates v4 results Difficulty

No Item Problem	Level	
	Value	Criteria
1	0.71	Easy
2	0.47	Medium
3	0.63	Medium
4	0.11	Difficult
5	0.74	Easy
6	0.18	Difficult
7	0.76	Easy
8	0.82	Easy
9	0.53	Moderate
10	0.95	Easy
11	0.79	Easy
12	0.76	Easy
13	0.68	Moderate
14	0.03	Difficult
15	0.79	Easy
16	0.32	Moderate
17	0.71	Easy
18	0.82	Easy
19	0.53	Moderate
20	0.87	Easy

Based on the data from the results of the analysis the items in Table 3 have been classified according to the index of difficulty of the items showing numbers which is stated as difficult or easy in an item. And obtain reliability of 0.59 with good reliability classification. Student learning outcomes data obtained from the cognitive and psychomotor domains. Cognitive learning results were obtained from researchers when giving test questions to students in the form of *posttest*. While psychomotor learning outcomes are obtained by researchers when the learning process takes place by giving assignments or projects to students, which are then assessed by scoring rubrics made. The results of the psychomotor value of the experimental class or given *treatment* can be shown in Table 4.

Table 4. Psychomotor Value

Group	Assessment Criteria						Number of	Values Final
	A	B	C	D	E	F		
group 1	4	4	4	3	4	3	22	92
group 2	4	4	4	3	3	3	21	88
group 3	4	4	3	4	4	3	22	92
group 4	3	4	2	3	3	3	18	75
group 5	4	4	2	4	3	3	20	82
group 6	4	4	3	3	3	3	20	82
group 7	3	4	2	3	3	3	18	75
groups 8	3	4	4	2	2	3	18	75
groups 9	3	4	3	2	3	3	18	75
Groups 10	4	4	3	3	3	3	20	82

4. Conclusion

After applying the project-based learning can be concluded that learning model in solving subnetting material problems in network design subjects can improve student learning outcomes namely the results of hypothesis testing by using the independent t-test, yielding tcount of 8.8634 with P-Value 0,000 and significance level of 5%. In accordance with the criteria in the t-test, if obtained tcount > t table then there is a significant difference means that H0 is rejected or H1 is accepted. If obtained tcount < t table then there is no significant difference means H0 is accepted or H1 is rejected. From the results obtained, the value of tcount = 8.8634 and t table = 2.00172 thus tcount > ttable, it can be concluded that H1 is accepted or there are differences in student learning outcomes using a module based on project-based learning with students who do not use project-based modules learning in solving subnetting problems..

Obtained RPP validation results with an average value of 83.85%. If seen from table 3.6 [6] regarding the interpretation of the size of the validation assessment with the average included in the Very Valid assessment criteria. Material validation results with an average value of 81.23%, regarding the interpretation of the size of the validation assessment with the average included in the Very Valid assessment criteria. Validation results of LP projects with an average value of 80.00%, regarding the interpretation of the size of the validation assessment with the average included in the Valid assessment criteria. the results of the validation of the test instrument with an average value of 84.10%, regarding the interpretation of the size of the validation assessment with the average included in the Very Valid assessment criteria. The results of the validation assessment, it is stated that this research is feasible to be implemented in applying a project-based learning based learning module as a solution to subnetting material problems

5. References

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