Project Based Learning (PjBL) Model to Increase Motivation and Skills in Building Wireless Networks

Kurnia Dwi Ariyanti[1*]
[1] Computer and Network Engineering, SMK Negeri 1 Trowulan
*Email: kurniadwiariyanti@gmail.com

ABSTRACT
The low learning outcomes of students in the area-based network technology (WAN) subject in the matter of building a wireless network for class XI TKJ 1 students at SMKN 1 Trowulan became the background for this class action research. Researchers feel that the teaching and learning process is still centered on the teacher, material is often presented in the form of lectures and demonstrations so that researchers often find students are more silent and just listen, their creativity and independence are less realized and the teaching and learning process does not run as expected. This is the cause of student learning outcomes are still low. Through the results of class action research, namely by using the Project Based Learning (PjBL) learning model, there is an increase in motivation and skills in building wireless networks for class XI TKJ 1 students of SMK N 1 Trowulan in the even semester of 2021/2022, namely the motivation to build a wireless network with the title Very Good, which was originally 17%, increased to 20% and with a Good predicate, which was originally 46%, increased to 66%. While the results of learning/drawing skills, namely the highest score originally only 79 became 82, the lowest score which was originally 68 became 75 which means that all students passed the KKM, while the average which was originally 74.90 became 78.12.

Keywords: Project Based Learning Model, Motivation, and Skills in Building Wireless Networks.

INTRODUCTION

Efforts to improve the quality of education is to improve the learning process. The quality of students can be seen at the level of student achievement influenced by learning motivation. The implementation of the Teaching and Learning Activity process for Computer and Network Engineering, especially the productive subject matter of building wireless networks implemented in the Class XI TKJ 1 Computer and Network Engineering department, shows that students' motivation and skills in building wireless networks are still low (Yuan et al., 2020). Based on the evaluation report on the results of teaching and learning activities, especially for material on building wireless networks, it shows that the results achieved by the participants are still below 66 percent on average, or with scores ranging from 75 to 80 percent (Yustina et al., 2020). Based on the results of observations and interviews with several students, it was concluded that one of the reasons for the low achievement of the value of building a wireless network was partly due to the low motivation and skills of the participants in learning material on building a local network.

Based on this, the researcher realized that there were problems in the teaching and learning process on the material for building wireless networks. After identification of the problem of low student scores, there are several causes for this to occur, including 1) Weak ability of students to understand and master the subject matter, 2) The ineffectiveness of the learning process is assumed to be inappropriate learning techniques and methods, 3) The need for a ways or methods that enable students to learn more creatively and independently (Ujir et al., 2020).

The problems above are a reflection of the results of the process of observation, evaluation, as long as the researcher teaches the subject (Gregory et al., 2016). Researchers are required to immediately find a way out, so that unexpected conditions do not become a "chronic illness" that always undermines learning itself (Hidayatulloh et al., 2021). Presumably, the implementation of learning improvement is

done through research Class Action (CAR) is the right choice to overcome this condition.

Project Based Learning (Project Based Learning) is a learning method that uses projects/activities as media. Learners explore, assess, interpret, synthesize, and information to produce various forms of learning outcomes (Ennis, 2018). Project-Based Learning is a learning method that uses problems as a first step in gathering and integrating new knowledge based on experience in real activities. By doing project-based learning it will be able to increase students' learning motivation to learn, encourage their ability to do important work, improve abilities problem solving and make students more active and successful in solving complex problems.

METHOD

The research conducted was Classroom Action Research. The research was conducted at SMK Negeri 1 Trowulan. The subjects of this study were all students of class XI TKJ 1 Trowulan State Vocational School in the even semester of the 2021/2022 academic year, a total of 36 students consisting of 9 girls and 26 boys. The objects in this study are the motivation and skills to build a wireless network for class XI TKJ 1 students of SMK Negeri 1 Trowulan in the even semester of the 2021/2022 school year. Data collection techniques used in this study are documentation techniques, observation and project creation techniques (Sugiyono, 2018). The data collection tools are in the form of learning journal notes, observation sheets of drawing motivation, grades list documents, and project implementation procedures.

Motivational data and data on learning outcomes/drawing skills in building a wireless network at the pre-cycle, cycle 1 and cycle 2 were analyzed using a comparative descriptive technique followed by critical analysis by reflecting. Through this comparative descriptive technique the researcher will compare the learning outcomes of students before being given an action, after the action in cycle I and in the final condition or after the action in cycle II. Reflection, namely making conclusions based on comparative descriptive then providing a review of these conclusions to determine whether or not the next cycle of action is necessary. The steps used in classroom action research are as follows: (1) Pre-cycle, observing learning that has not used the project based learning model with the help of colleagues, (2) Cycle 1, in cycle 1 using the project based learning model in large groups and (3) Cycle 2, using a project based learning model with small groups.

RESULT AND DISCUSSION

In the initial conditions, the motivation of students in taking part in learning to build a wireless network in class XI TKJ 1 students at SMK N 1 Trowulan in the even semester of 2021/2022 is still low. The learning outcomes have not yet implemented a project-based learning model. The learning process is carried out by means of lectures and practical demonstrations. The results of the initial conditions are described in the following pre-cycle learning outcomes diagram.
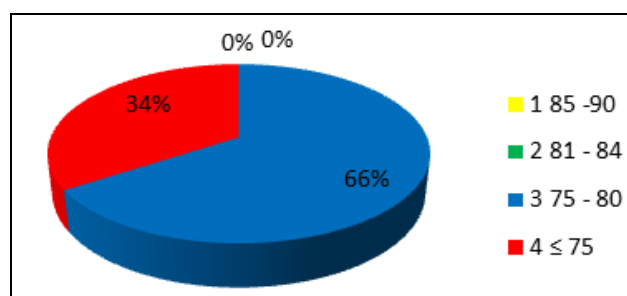

Figure 1. Interval of learning outcomes in initial conditions

From the data in the tables and diagrams above, the highest score obtained by students is 79, while the lowest score is 68. The average value is 74.9. The range of the highest and lowest scores is 11. Values ≤ 7.50 are 34%, $7.5 - 8$ are 66%, $8.10 - 8.4$ are 0% and $8.50 - 9.00$ are 0%. The learning process in cycle I refers to the learning plan that has been prepared by the researcher. In the learning process of cycle I, it has implemented project-based learning. There is an increase in student learning outcomes in the material for building wireless networks that researchers encounter, but it is still not as expected. The learning outcome interval in cycle 1 is described as follows
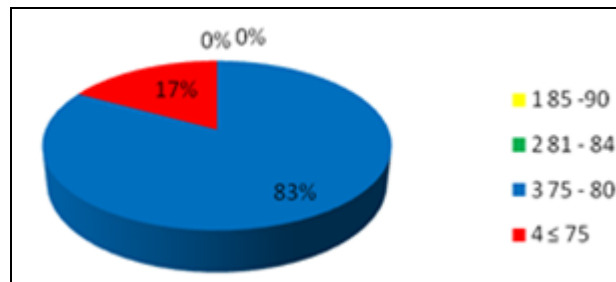
Figure 2. Cycle 1 Learning Outcome Interval

From these data, the highest score is 79, while the lowest is 74. The average value is 75.91. The range of the highest and lowest scores is 5. Achievement of scores ≥ 75 is 83%. Even though the highest score is still the same, namely obtaining 79, it has increased because the lowest value which was originally 68 became 74, the average which was originally 74.90 became 75.91 and the range of the highest and lowest values which were originally 11 became 5. This means that in the pre-cycle the value students whose KKM was 66.71% while in cycle 1 it increased to 82.86%. This means that the target of achieving a score of ≥ 75, a minimum of 85% has not been achieved. To achieve KKM, students who get a score of ≤ 75 are held remedial/improvement of assignments until students reach a minimum score of 75. The value obtained by these students is still not as expected. many students are less creative and always wait for instructions from the teacher. Another obstacle is that researchers are too fast in conveying information and explaining procedures for implementing Project-based learning, so that students do not understand the learning techniques presented. Therefore, it is necessary to improve the learning process for the next cycle, so that in cycle II an interesting and not boring learning process will be created for students, which in the end students will be more active during the learning process. The implementation in cycle II discussed the subject of Basic Networks learning 2. The learning process carried out was not much different from learning in cycle I, it's just that researchers had made several improvements according to the results of reflection on the performance of researchers during cycle I. In cycle II the researcher explained in more detail to students regarding procedural techniques for implementing the Project Based Learning model so that the implementation of learning is smoother. Researchers also provide assistance in the form of directions to students if students experience difficulties in completing projects. The competency values obtained by students in cycle II can be seen from the graphs and diagrams below.
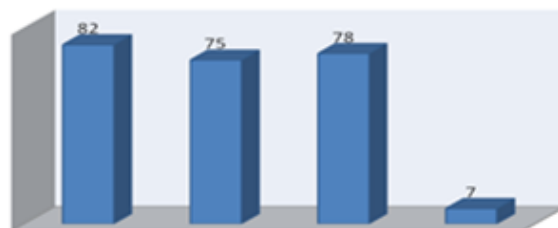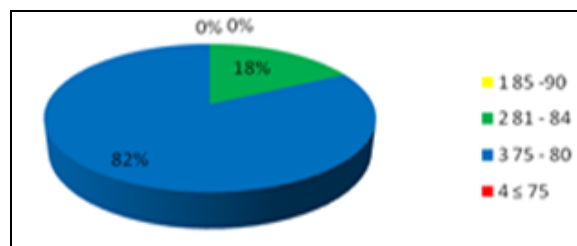

Figure 3. Student scores based on KKM Cycle 2

Figure 4. Percentage based on KKM Cycle 2

The highest score is 82, while the lowest score is 75. The average value is 75.94. The range of the highest and lowest scores is 7. This means that in the pre-cycle the students' KKM score was 66.71%, in cycle 1 it increased to 82.86% and in cycle II to 100%. This means that the target of achieving a score of ≥ 75, a minimum of 85% has been achieved.
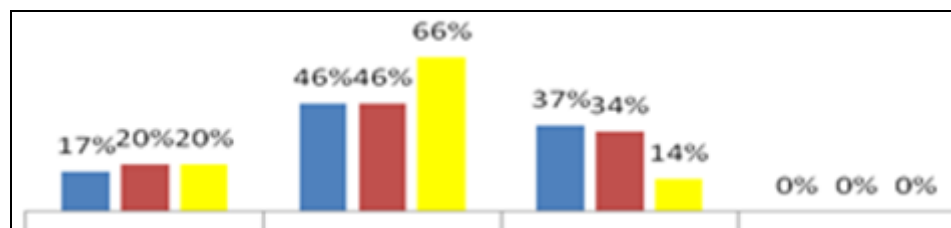
Figure 5. Comparison of Percentage of Motivation from Pre Cycle-Cycle 1–Cycle 2

From Figure 5 above it can be concluded that in the final condition the motivation in learning the material to build a basic network for class XI TKJ 2 students has increased. If students' self-learning motivation increases, it will lead to learning activities, which guarantee the continuity of learning activities and provide direction to learning activities, so that the goals desired by the learning subject can be achieved. Based on the results of this study, it turns out that learning using the Project Based Learning model is applied to material on building wireless networks in class XI TKJ1 SMKN 1 Trowulan and can improve student learning outcomes

CONCLUSIONS

Based on the results of data analysis of Classroom Action Research with the title "Project Based Learning (PjBL) Model to Increase Motivation and Skills in Building Wireless Networks for Class XI Computer and Network Engineering SMK Negeri 1 Trowulan there are several changes that occur in the learning process. This process occurs along with changes to the learning model such as students learning are more motivated, students are more creative and don't feel bored, even though the teacher feels happy in giving lessons. This has an impact on increasing the percentage of student success in learning.

In order for the teaching and learning process to take place properly, the teacher must be able to choose a learning model that is appropriate to the material to be delivered. By choosing the right model, it is hoped that students will more easily understand and accept lessons. Hopefully this PTK can be used as a reference for teachers in overcoming learning problems and increasing student learning outcomes.

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