

The Effect of Implementing the Problem Based Learning Model on the Motivation and Learning Outcomes of Class XI TKRO Students in the Light Vehicle Engine Maintenance Subject at SMK Negeri 1 Pangaribuan

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ABSTRACT

This research aims to determine the effect of applying the problem-based learning (PBL) learning model on student motivation and learning outcomes in light vehicle engine maintenance subjects. This type of research is quasi-experimental, with the research design used being a pretest-posttest control group design. The research results showed that in the experimental class, it was obtained pretest 48.12 and initial motivation 47.63%, posttest experimental class obtained 76.8 and final motivation. 6%, while in the control class obtained pretest 47.15 and initial motivation 45.78%, posttest obtained 70.06 and final motivation 59.6%, so it was concluded that there was a positive influence of the application of the problem-based learning model on student motivation and learning outcomes.

INTRODUCTION

Education is an effort to realize learning activities so that students can actively learn and develop their potential to become better in terms of intelligence, knowledge, personality, and so on. Meanwhile, etymologically, the meaning of education is the process of developing one's own abilities and individual strengths; this is in accordance with the National Education System Law (Jakarta: Sinar Graphics, 2010). Education is also a conscious effort, not a random act, so that one becomes a responsible and independent adult human being.

One of the important principles in education today is that learning is no longer centered on teachers, and teachers should make learning more innovative so as to encourage students to learn more optimally both in the classroom and outside the classroom in accordance with the curriculum (Sujianto, 2008). However, currently, expectations are not in line with what was envisioned. Observation findings in the field show that there are still many shortcomings, one of which is that the learning process is still centered on the teacher, where the learning process is limited to the lecture method and delivery of material by the teacher, so that the impact on students' motivation and learning outcomes is classified as low. Observation findings also show that there is low motivation to learn, as seen from observations of learning in class, where during learning students often excuse themselves, go in and out of class, are sleepy, or do not pay attention to learning. Low motivation of students in the learning process will affect learning outcomes; learning uses more lecture methods; and the learning process is more teacher-centered, which will reduce student activity in learning. This proves that the reality of the problems faced is very far from the ideal conditions that should occur in the field. The conditions found were that the learning outcomes of class XI students in the subject of light vehicle engine maintenance at SMK Negeri 1 Pangaribuan were still relatively low.

Table 1. Percentage of Average Minimum Criteria Scores for Class X TKRO Students at SMK Negeri 1 Pangaribuan

No	Class	School year	Many Students	Complete	Percentage	Ket.
1.	TKRO A	2022/2023	35	10	34.6 %	C
2.	TKRO B	2022/2023	35	13	40.7%	C

Source: SMK Negeri 1 Pangaribuan

SMK Negeri 1 Pangaribuan is a school that prepares students to be ready to use in the world of work, especially ready to work in their field. One of the subjects in the Light Vehicle Engineering (TKRO) expertise competency is Light Vehicle Engine Maintenance (PMKR). Through this subject, students are required to understand the basics of car engine maintenance and upkeep, one of which is lubricant system maintenance.

One of the issues experienced in the realm of schooling is the feeble educational experience, where understudies are not sufficiently guided to foster

reasoning abilities. So far, the development process in the classroom has only been directed at students' ability to memorize information. This turns out to be in line with the problems encountered at SMK Negeri 1 Pangaribuan. There are still many shortcomings that occur among students, which results in the desired learning outcomes and minimum subject completion criteria (KKM) not being met by the students. The learning results for light Vehicle Engine Maintenance for class.

Table 1 shows that student learning outcomes are relatively low based on interviews with teachers in the field of studies on light vehicle engine maintenance. In the 2022/2023 academic year, of the 35 TKRO A students, only 34.6% were declared to have passed, and in TKRO B, only 40.7% passed. To boost students' grades so they can pass the subject, the teacher takes the second step, namely by conducting remedial measures for students. Actually, there is no problem with doing remedial, but it is better if, when learning is carried out, students understand and care about what the teacher is teaching so that during the exam all problems can be answered correctly and remedial does not need to be done. The fact is that students only get the method of observing and listening to what is taught by the teacher; this makes the learning process dominated by the teacher and only a few students. Meanwhile, students who are passive in class do not have much of a role in the learning process.

The findings of observations made during the learning process in class light will have a big impact on student learning outcomes. A more enjoyable learning approach can be suggested as a way to solve this problem by choosing a learning model that values student participation and communication. The group learning model is one that can be entertaining because students can connect with each other by using this group learning technique, which can increase motivation and learning outcomes. Problem based learning is a type of group learning, to collect and integrate new knowledge created by students themselves.

Based on the description above, the author is interested in conducting research with the title "The Effect of Implementing the Problem Based Learning Model on the Motivation and Learning Outcomes of Class XI TKRO Students in the Light Vehicle Engine Maintenance Subject at SMK Negeri 1 Pangaribuan"

LITERATURE REVIEW

Problem Based Learning Model

The problem-based learning model known as "problem-based learning" was created with the goal of helping students acquire important knowledge, become proficient at problem solving, and acquire the skills necessary to work in groups. Issue-based learning was created to assist understudies with fostering their initiative abilities, critical abilities to think, and mental abilities. According to Desriyanti and Lazulva (2016), learning that requires a teacher to solve a problem can be integrated with the problem-based learning (PBL) approach. According to Panoto et al. (2017) PBL has the following learning schemes: reporting, solutions and reflection, general overview, integration and

evaluation (concluding, integrating, and evaluating), problem meetings, and reporting.

Motivation to learn

Students' total psychological motor for creating, maintaining, and directing learning activities toward achieving goals is known as learning motivation (Nasution, 2018). Motivation to learn is an encouragement both from within the student and from outside that will bring changes to a person, such as the person's experience of himself and his relationship with his environment, and to achieve the expected goals. Motivation to learn is more intellectual and psychological in nature.

Learning outcomes

Suginem (2021) Learning is the process of changing behavior due to practice and experience. All facets of behavior will show this change. Humans learn to develop various competencies, skills and attitudes. Winkel believes that learning outcomes are "changes that cause humans to change their attitudes and behavior" (Purwanto, 2014). Learning outcomes, on the other hand, are "the abilities that students have after they receive their learning experience", according to Sudjana (2014).

Expository Learning Model

Liyusri and Situmorang (2013) stated that the Expository Learning model is a direct learning model because the learning is delivered directly by the teacher, students are not required to find the material because the lesson material seems to have been prepared by the teacher and places more emphasis on the speaking process.

METHODOLOGY

This type of research includes quasi experimental research, namely research that aims to determine whether there are differences due to the influence of the application of something imposed on students.

The population in this study were 2 class students of class XI TKRO SMK Negeri 1 Pangaribuan. The samples in this study were two classes, with one class as the experimental class and one as the control class. The sampling technique used in this research was a random sampling technique.

The following is a scheme of research procedures that will be carried out.

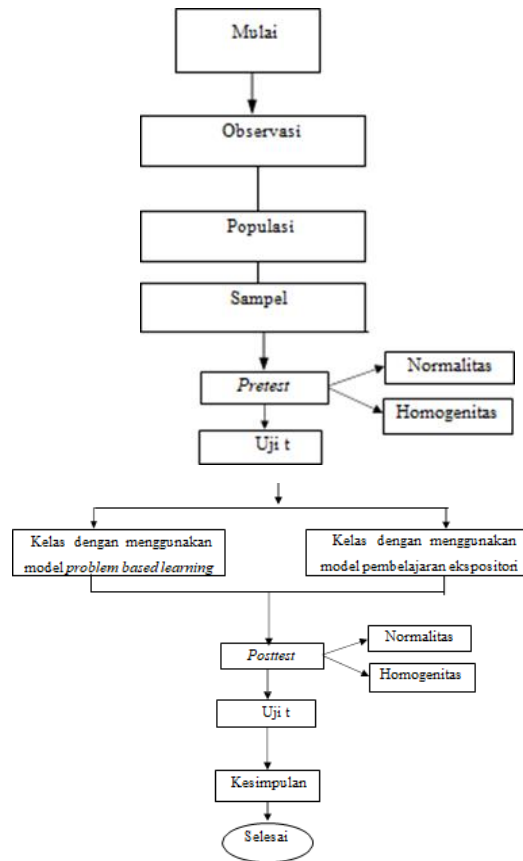


Figure 1. Research Procedure Scheme

RESEARCH RESULT

Normality test

Table 2. Results of the Pre-test and Post-test Normality Test for Experimental and Control Classes

Mark	Experiment		Control	
	Pre-test	Post-test	Pre-test	Post-test
L_{count}	0.111	0.151	0.103	0.133
Table	0.154	0.154	0.154	0.154

In light of table 2, it very well may be seen underneath that $L_{count} < L_{table}$, hence it tends to be reasoned that the pre-test and post-test information in the exploratory class and control class are ordinarily circulated.

Table 3. Normality Test Results of Initial Motivation and Final Motivation for Experimental and Control Classes

Mark	Experiment		Control	
	Initial motivation	Final motivation	Initial motivation	Final Motivation
L_{count}	0.108	0.094	0.138	0.061
Table	0.154	0.154	0.154	0.154

$L_{count} < L_{table}$ can be seen in Table 3, indicating that the initial and final motivation data in the experimental and control classes are normally distributed.

Homogeneity Test

Data homogeneity testing was carried out using the F test. There are two homogeneity test results, namely the pre-test and post-test homogeneity test and the homogeneity test of student learning motivation.

Table 4. Results of Pre-test and Post-test Homogeneity Test for Experimental Class and Control Class

Data	Pre-test		Post-test	
	Experiment	Control	Experiment	Control
Variance	50.48	72.75	57.75	47.12
F_{count}	1,441		1,225	
F_{table}	1,804		1,804	
Conclusion	Homogeneous		Homogeneous	

Based on Table 4.7, it can be seen that the pre-test data value $F_{count} = 1.441$ with F_{table} pretest data = 1.804 and F_{count} posttest data = 1.225 with F_{table} posttest data = 1.804 at a significant level of $\alpha = 0.05$. So the F_{count} value $< F_{table}$, then the sample variance homogeneous. Thus it can be concluded that the pretest data and posttest data for the experimental class and control class have relatively the same variance (homogeneous). This shows that the data obtained meets the homogeneity test requirements for hypothesis testing purposes.

Table 5. Results of Homogeneity Test of Initial Motivation and Final Motivation of Experimental and Control Classes

Data	Initial Motivation		Final Motivation	
	Experiment	Control	Experiment	Control
Variance	37.86	32.73	5.50	40.56
F_{count}	1,156		0.135	
F_{table}	1,804		1,804	
Conclusion	Homogeneous		Homogeneous	

Correlation Test

Table 6. Correlation Test

Data	rTable	rcount	Conclusion
Motivation to learn	0.448	0.344	There is a significant relationship
Learning outcomes			

Based on the table above, it is found that $r_{table} (0.448) > r_{count} (0.344)$ shows that learning motivation and student learning outcomes have a significant relationship.

Pre-test Ability Test and Students' Initial Motivation

In view of the consequences of the ordinariness trial of the underlying test information, it just so happens, the two examples are regularly conveyed and have homogeneous differences, so to test the speculation on starting skill, a typical fairness test with a two-followed t test is utilized, measurably the speculation is:

HO: $\mu_1 = \mu_2$

Ha: $\mu_1 \neq \mu_2$

Table 7. Summary of Pre-test Hypothesis Test Calculations

Data	Average	Q_{count}	Table	Conclusion
<i>Pre-test</i> Experimental Class	48.12	0.45	1.98	Thank Ho
<i>Pre-test</i> Control Class	47.15			

Table 8. Summary of Initial Motivation Hypothesis Test Calculations

Data	Average	Q_{count}	Table	Conclusion
Initial Motivation of the Experimental Class	47.63	0.076	1.98	Thank Ho
Initial Motivation of the Control Class	45.78			

To test the similarity of the pre-test averages in the experimental class and the control class, the value of t_{count} t_{table} was determined based on the calculation results in tables 4.9 and 4.10 with a significance level of $\alpha = 0.05$. These outcomes show the acknowledgment of the HO Speculation which concludes that the initial abilities and motivation of understudies in the trial class were equivalent to the control class.

Post-test Ability Test and Final Motivation of Students

Hypothesis testing is used to determine the influence of a treatment, namely the Problem Based Learning learning model, on motivation and learning outcomes. The hypothesis being tested is in the form of:

HO : $\mu_1 = \mu_2$

Ha: $\mu_1 \neq \mu_2$

μ_1 = average score of experimental class learning outcomes

μ_2 = average score of control class learning outcomes

Information :

HO: $\mu_1 = \mu_2$: The learning outcomes of experimental class and control class students are the same, meaning there is no influence of the Problem Based Learning learning model

Ha: $\mu_1 \neq \mu_2$: Student learning outcomes in the experimental class are higher than those in the control class, meaning it shows that there is an influence of the Problem Based Learning (PBL) learning model

The applicable testing criteria are: HO is accepted if $t_{count} < t_{table}$ where $t_{1-\alpha}$ is obtained from the distribution list t with $dk = (n_1 + n_2 - 2)$ and the probability of $t_{1-\alpha}$ with $\alpha = 0.05$. For other t values, HO is rejected and Ha is accepted.

Table 9. Summary of Post-test Hypothesis Test Results

Data	Average	tcount	ttable	Conclusion
Post-test Experimental Class	76.8	3.80	1,669	Thank you Ha
Post-test Control Class	70.06			

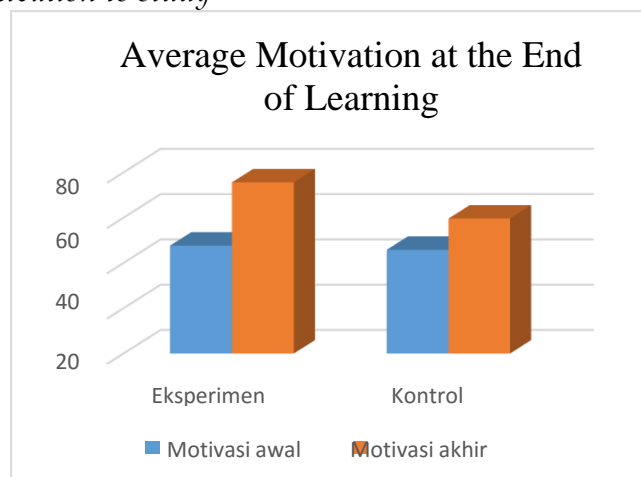
Table 10. Summary of Student Final Motivation Hypothesis Test Results

Data	Average	tcount	ttable	Conclusion
Motivation for the End of Experimental Class	75.6	7,906	1,669	Thank you Ha
End of Control Class Motivation	59.6			

Based on the table above, with a significance level of $\alpha = 0.05$, it is found that in both tables the value $t_{count} > t_{table}$, then Ho is dismissed and Ha is acknowledged. Therefore, on the basis of the research's findings, it is possible to draw the conclusion that the experimental class and the control class exhibit significant differences in student motivation and learning outcomes. Students in the experimental class typically exhibit higher levels of both motivation and learning outcomes than students in the control class. The application of the can lead to the conclusion that Motivation and student learning outcomes are influenced by the problem-based learning (PBL) learning model.

DISCUSSION

Student's motivation to study



In light of Figure 2, it very well may be seen that the consequences of this examination show that the typical worth of starting inspiration in the trial class was 47.63 and in the control class 45.78. Students in the Experimental class scored 75.6 in the high category after the treatment, while those in the control class scored 59.6 in the low category. So it tends to be reasoned that understudy learning inspiration utilizing the Issue Based Picking up learning model is superior to understudy learning inspiration utilizing the explanatory learning model.

Table 11. Learning Motivation Criteria

Percentage	Category
80%-100%	Very high
65%-80%	Tall
55%-65%	Currently
40%-55%	Low
0%-55%	Very low

This change shows the influence of the problem based learning model on students' learning motivation after being given treatment. Changes in initial motivation and final motivation occur according to the stages in the learning process. Students pay attention to the teacher when doing demonstrations, work together in solving real problems in learning, ask questions during group discussions and class discussions, and utilize learning resources, so that every The stages can increase students' learning motivation.

Several research results state that PBL is able to increase student learning motivation. Devi (2014) and Ramlawati (2017) in their research revealed that the learning motivation of the group of students who studied using the PBL model was higher compared to the group of students who studied using the conventional model. This is also in line with The opinion of (Yen et al.) in (Rosyidah et al., 2019) is that PBL is able to increase student learning motivation and student learning motivation has a positive effect on students' ability to understand concepts.

Therefore, the expected learning activities, teachers can increase students' motivation to study well. The emergence of motivation to study the quality of various things, including other things because of the desire for strength for academic success. High student learning motivation tends to produce more effective student learning abilities, otherwise low student learning motivation will reduce learning abilities.

Learning outcomes

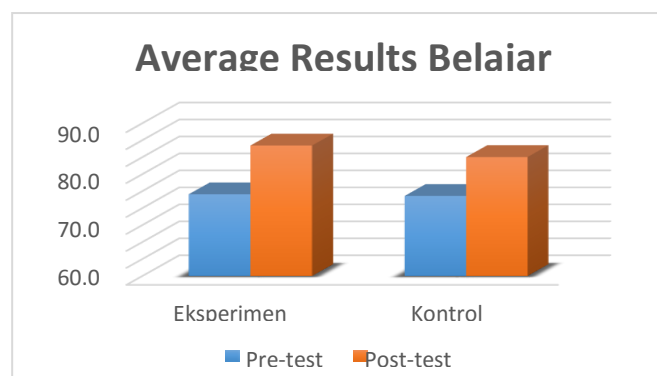


Figure 3. Learning outcomes of experimental and control class students

The aftereffects of the examination show that there is an impact of the use of the Issue Based Learning (PBL) learning model at SMK Negeri 1 Pangaribuan class the control class normal was 47.15. Then the post-test information got in the exploratory class was more prominent than the control class, in particular the normal post-test score for the trial class was 76.8 and in the control class the typical post-test score was 70.06. So it tends to be inferred that the aftereffects of finding out about light vehicle motor upkeep utilizing the issue based learning model are superior to the consequences of picking up utilizing interpretive.

The success of the Problem Based Learning (PBL) learning model is due to the maximum emphasis on students' activeness and involvement in the learning process. Learning activities begin by exposing students to a problem and inviting them to observe real problems related to concepts. The aim is to provide stimulation to students in formulating problems, which then test the hypotheses that have been created with the concepts that have been studied. In accordance with constructivist learning theory, it states that students must find complex information themselves, look for new information using old rules, and revise it if the rules are not appropriate. Previous research (Kawuri, Ishafit, & Feyanto, 2019), found that the problem-based learning model had a positive effect on student learning outcomes. Students in the experimental class had higher average scores than students in the control class, according to this study.

The Relationship between Learning Motivation and Learning Outcomes

Using the Problem-Based Learning learning model, the purpose of this study is to ascertain whether there is a significant connection between student learning outcomes and learning motivation. A correlation test was then carried out with the intention of determining the significant relationship between learning motivation and student learning outcomes in learning employing the Problem Based Learning learning model after normality and homogeneity tests were conducted with the goal of determining a normal and homogeneous data distribution. The correlation test results of $r_{Table} (0.448) > r_{count} (0.344)$, which were obtained through data analysis, indicate that there is a unidirectional relationship between student learning motivation and learning outcomes. If student learning motivation rises, so do student learning outcomes, indicating a significant relationship.

CONCLUSIONS AND RECOMMENDATIONS

In view of the consequences of the examination and aftereffects of speculation testing completed at SMK Negeri 1 Pangaribuan in class XI TKRO in the Light Vehicle Motor Support Subject, it tends to be reasoned that:

1. There is an impact of the Issue Put together Learning Model with respect to understudy learning inspiration in the Light Vehicle Motor Upkeep subject class XI TKRO at SMK Negeri 1 Pangaribuan, to be specific with a score of 75.6

2. At SMK Negeri 1 Pangaribuan, students' learning outcomes in the subject Light Vehicle Engine Maintenance Class XI TKRO are influenced by the Problem Based Learning Model, with a score of 76.8.
3. Students' learning outcomes in the Light Vehicle Engine Maintenance subject XI TKRO at SMK Negeri 1 Pangaribuan are significantly influenced by Learning Motivation.

ADVANCED RESEARCH

Future researchers are advised to be smarter in optimizing time at each learning stage by making a detailed schedule for each activity stage, including the time allocated for presentation of group discussion results.

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