JES
Journal of Educational Studies
https://ejournal.baleliterasi.org/index.php/JEs

The Application of Learning through a Scientific Approach based on Project-based Learning with Hots Orientation

Nova Kristina
SMKN Negeri 1 Kikim Tengah
novak6310@gmail.com

Abstract

The 2013 curriculum is a national curriculum that has been developed by the Ministry of Education and Culture with the aim of preparing students to have productive, creative, innovative and affective learning skills and be able to contribute to the life of society, nation and state. However, in practice,there are still some difficulties such as material and assignments that are not in accordance with the background of students. In addition, this curriculum still focuses on mastering cognitive knowledge which is more concerned with memorizing material. Thus, the students' thinking processes are still at level C1 (remembering), understanding (C2), and C3 (application). This study aims to (1) find out the application of HOTS-oriented PBL (Problem Based Learning) learning in English with procedural text in class XI TKJ at SMKN 1 *Kikim Tengah*, and (2) find out the increase in English learning outcomes with procedure text material in class XI TKJ at SMKN 1 *Kikim Tengah* using the HOTS (Higher Other Thinking skills) oriented PBL (Problem Based Learning) model. The learning media used are laptops, LCD projectors, videos, power point, while the tool used is the Conventional Brake System Trainer Instrument with data collection techniques using the Problem BASED Learning model. As for the results and discussion, they will be discussed further in the results and discussion section.

1.Introduction

Learning about the PSDPT Maple especially on the Brake System at SMK majoring in TKJ in accordance with the demands of the 2013 Curriculum is a HOTS-oriented integrated learning approach.

In the 2013 Curriculum learning practices that the writer has been doing so far, the writer uses student books and teacher books. The author believes that the book is appropriate and good

for use in class because it was published by the Ministry of Education and Culture. Apparently, in practice, the writer experienced several difficulties such as the material and assignments did not match the background of the students. Besides that, the writer still focuses on mastering cognitive knowledge which is more concerned with memorizing material. Thus the students' thinking processes are still at level C1 (remembering), understanding (C2), and C3 (application). Teachers almost never carry out learning that is oriented towards higher order thinking skills (HOTS). The author also rarely uses learning media. impact,

Based on the results of observations made by the author with several students, information was obtained that students were bored with participating in lessons that were mostly carried out by teachers using lecture methods other than lectures, the method that was always carried out by the teacher was assignment. Some students claim to be bored with tasks that are only theoretical. It remains only to copy from the textbook.

To face the Industrial Revolution 4.0 era, students must be equipped with higher order thinking skills. One of the HOTS-oriented learning models and suggested in the implementation of the 2013 Curriculum is the Problem Based Learning model which guides students to observe (read) problems, write down solutions and present the results in front of the class, learning models that prioritize learning strategies by using problems from the real world as student contexts to learn about critical thinking and problem solving skills, as well as to acquire essential knowledge and concepts from the material being studied. In Problem Based Learning students are required to be able to solve real problems in everyday life (contextual). In other words,

After carrying out learning the Brake System with the Problem BASED Learning model, the authors found that the process and student learning outcomes increased. Better than previous studies. When the Problem BASED Learning model was applied to other XI TKJ classes, it turned out that the students' learning processes and outcomes were just as good. The authors conclude this successful learning practice as a best practice (good practice) HOTS-oriented learning with the Problem BASED Learning model.

The Sustainable Professional Development Program through Increasing Zoning-Based Learning Competency is one of the efforts of the Ministry of Education and Culture through the Directorate General of Teachers and Education Personnel (Ditjen GTK) to improve the quality of learning and improve the quality of graduates. This program was developed following the direction of the Ministry of Education and Culture which emphasizes learning oriented towards higher order thinking skills or Higher Order Thinking Skills (HOTS). Higher-order thinking skills

are complex thinking processes in describing material, making conclusions, building representations, analyzing and building relationships involving the most basic mental activities that should be possessed by a professional teacher.

Learning units that have been arranged are expected to improve learning. The Learning Unit developed is devoted to Basic Education which in this case will involve the SMK KKG and MGMP TKJ. We express our gratitude and highest appreciation to the entire drafting team from PPPPTK, LPMP, and Universities and various parties who have worked hard and contributed positively in realizing the completion of this Learning Unit. The activities reported in this good practice report are learning activities for the PSDPT subject in class XI TKJ in KD Conventional Brake Systems.

In order to improve efficiency, effectiveness, and equity in the quality of education, the implementation of the PKP Program considers a regional approach, otherwise known as zoning. Through this step, the management of the SMK Teacher Activity Center (PKG), the SMK teacher working group (KKG) and the TKJ subject teacher deliberations (MGMP) which have so far been carried out through Clusters or Rayons in their zoning, can be integrated through zoning development and teacher empowerment. Zoning takes into account the balance and diversity of education quality in the immediate environment such as school accreditation status, teacher competency scores, school average UN/USBN scores, or other quality considerations.

The purpose of writing this good practice is to describe knowledge and skills activities in implementing higher order thinking skills (HOTS) oriented learning. The target of implementing this best practice is class XI TKJ at SMKN Negeri 1 Kikim Tengah with a total of 27 students. It is hoped that this Learning Unit can inspire teachers to develop materials and carry out learning oriented towards higher order thinking skills. Here are some of the benefits of PKP for students, teachers and schools.

2.method

2.1Participants

This practice was carried out from 2 to 5 December 2022 for the XI TKJ Workshop at SMKN Negeri 1 Kikim Tengah.

2.2 Data Collections

2.2.1 Instrument of Collecting Data

The learning media used are laptops, LCD projectors, videos, power points, while the tools used are Conventional Brake System Trainers. There are 2 kinds of instruments used in this good practice, namely: (a) instruments to observe the learning process in the form of observation sheets

and (b) instruments to see student learning outcomes using (a) multiple choice written tests and brief descriptions.

The material used in this good learning practice is class XI TKJ material for the PSDPT subject on KD Conventional Brake Systems:

Basic competencies			Indicator
3.21	Diagnosing conventional brake system malfunctions	3.21.1	Determine how to check for damage to a conventional brake system
		3.21.2	Detects the location of damage to conventional brake systems
4.21	Repair brake system conventional	4.21.1	Fixed system crash conventional brakes
		4.21.2	Control the results of system repairs conventional brakes

2.2.2 Techniques for Collecting Data

The method used in the implementation of this good practice is to apply learning with the Problem Based Learning model. The following are the steps for implementing good practices that have been carried out by the author: 1) KD mapping; KD mapping is carried out to determine KD that can be applied in learning the Brake System. Based on the results of the KD study in class XI TKJ, the authors chose the inquiry learning model. 2) Analysis of Competency Targets; The results of the competency target analysis are as follows. Formulation of Competency Achievement Indicators (Brake System).

Basic competencies			Indicator
3.21	Diagnosing conventional brake system malfunctions	3.21.1	Determine how to check for damage to a conventional brake system
			Detects the location of damage to conventional brake systems
		3.21.2	
4.21	Repair brake system conventional	4.21.1	Fixed system crash conventional brakes
		4.21.2	Control the results of system repairs conventional brakes

3) Selection of Learning Models; The chosen learning model is Problem Based Learning. 4) Planning learning activities according to the Learning Model Development of learning designs is carried out by detailing learning activities carried out according to the syntax of Problem BASED Learning. The following is a learning activity plan developed based on the Problem BASED Learning model.

Core activities	**Phase I**
	a) Problem orientation;
	Students observe one of the contextual problems presented by the teacher, such as the following example:
	1. Differences in the workings and functions of the brake system when viewed from the mechanism
	2. How to do periodic maintenance of the brake system on motor vehicle
	Phase II
	b) Collection data and verification;
	Students can discuss with their peers/groups to dig up information from various literature

3.Results

Table 1 presents the mean scores (M), standard deviations (SD), and mean differences between the scores by the ENL-speaker assessors and the ESL-speaker assessors (Mdiff).

Table 2 shows the correlation coefficients of the factors determining intelligibility and their ranks in strength of correlation for the ENL speakers and the ESL speakers. Concerning the rank order of the intelligibility factors, the Spearman's correlation test revealed that there was no significant relationship between the assessment of the ENL speakers and that of the ESL speakers, rs = .18, p = .64. It means that the data of the five ENL speakers do not correlate with the data of the five ESL speakers.

4. Discussion

Results

The results that can be reported from this good practice are described as follows: 1) The learning process of the Brake System which is carried out by applying the Problem Based Learning model is active. Students become more active in responding to questions from the teacher, including asking questions to the teacher and friends. Learning activities designed according to the syntax of Problem Based Learning require students to be active during the learning process. 2) Learning the Conventional Brake System which is carried out by applying the Problem Based Learning model improves students' ability to transfer knowledge.

After reading, summarizing, and explaining the processing of space, time and energy according to counts or beats, students not only understand dance processing (conceptual knowledge) and how to make the correct dance moves (procedural knowledge), but also understand how conventional brake systems work. This understanding becomes the basis for students in studying conventional brake system material. 3) Application of the Problem Based Learning model improves students' ability to think critically. This can be seen from the level of participation of students to ask questions and respond to topics discussed in learning.

In previous studies conducted by the author without being HOTS oriented, the class atmosphere tended to be boring. Students tend to work individually to compete in completing the assignments given by the teacher. The teacher's focus is on how students can complete the questions presented; less concerned about students' thinking processes. Not only that, learning material which has always been presented in a deductive manner (starting with theoretical lectures on the material being studied, assignments, and discussions), makes students tend to memorize theory.

The knowledge acquired by students is what is taught by the teacher. The conditions are different from HOTS-oriented conventional brake system learning by applying this Problem Based Learning. In this lesson, students' understanding of functions, how to work based on construction along with periodic maintenance on conventional brake systems makes students more able to apply the learning process of a good conventional brake system. Through this observation and discussion also requires the ability of students to think critically.

4) The application of the Problem Based Learning model also improves students' ability to solve problems (problem solving). The Problem Based Learning model that is applied by presenting written text and pictures containing contextual problems is able to encourage students to formulate problem solving. Before implementing Problem BASED Learning, the authors carried out learning according to the teacher's book and student book. Even though the problems presented in textbooks are sometimes not in accordance with the daily lives of students, the author still uses them. The type of text used is also only written text from textbooks. By implementing Problem Based Learning, students not only learn from written text, but also from pictures and are given open opportunities to look for data, material from other sources.

Problems encountered

The main problem faced is that students are not used to learning with the Problem Based Learning model. With the aim of getting good test scores the teacher always uses the lecture method, students also feel more confident facing tests (assessments) after receiving explanations from the teacher through lectures.

How to Solve Problems

In order for students to believe that learning conventional brake systems with Problem Based Learning can help them better master learning material, the teacher gives a brief explanation of what, how, why, and the benefits of learning oriented towards higher order thinking skills (HOTS). Understanding and awareness of the importance of HOTS will make students motivated to take part in learning. In addition, the awareness that learning is not just memorizing theories and concepts will make students want to learn with HOTS. The teacher's inability to make learning media can be overcome by downloading images according to the KD that will be taught either from Google or other learning resources. Thus, apart from implementing reading and writing literacy activities, students can also improve their digital literacy.

5. Conclusion

Based on the description above, the following conclusions can be drawn: 1) Conventional brake system learning with the Problem Based Learning model deserves to be a good HOTS-oriented learning practice because it can improve students' ability to transfer knowledge, think critically, and solve problems. 2) By systematically and carefully preparing a learning implementation plan (RPP), conventional brake system learning with the Problem Based Learning model implemented is not only HOTS oriented, but also integrates PPK, literacy, and 21st century skills.

Based on the results of the good practices of thematic learning with the Problem BASED Learning model, the following are relevant recommendations. 1) Teachers should not only teach by referring to the student books and teacher books that have been provided, but dare to innovate and be creative in contextual learning in accordance with the background of the students and the situation and conditions of their school. This will make learning more meaningful. 2) Students are expected to apply higher order thinking skills in learning, not limited to memorizing theory. The ability to learn in this way will help students master the material more deeply and last longer / not easily forget. 3) Schools, especially principals, can encourage other teachers to participate in implementing HOTS-oriented learning.

References

Ahmad, IF, Putro, NHPS, Thontowi, ZS, Syafii, A., & Subakti, MA (2020). Trends in the Implementation of Higher-Order Thinking Skills in Islamic Religious Education in Madrasahs and Schools: A Systematic Literature Review. Journal of Islamic Education, 9(2), 195–216.https://doi.org/10.14421/jpi.2020.92.195-216

Bintoro, 2013, Chassis Maintenance and Light Vehicle Power Transfer, Ministry of Education and Culture of the Republic of Indonesia

Novianti, A., Bentri, A., & Zikri, A. (2020). THE EFFECT OF APPLICATION OF PROBLEM BASED LEARNING (PBL) MODEL ON STUDENT ACTIVITIES AND LEARNING OUTCOMES IN INTEGRATED THEMATIC LEARNING IN ELEMENTARY SCHOOLS. Basicedu Journal, 4(1), 194–202. https://doi.org/10.31004/basicdu.v4i1.323

Nurhamidah, S. (2017). Application of the Problem Based Learning Model to Improve Learning Outcomes and Critical Thinking Skills in Learning Geography. JPG (Journal of Geography Education), 4(2).

Puspitasari, RP, Sutarno, S., & Dasna, IW (2020). The Effect of the Problem Based Learning Model on Higher Order Thinking Ability and Learning Outcomes of Fifth Grade Elementary School Students. Journal of Education: Theory, Research, and Development, 5(4), 503–511. ttps://doi.org/10.17977/jptpp.v5i4.13371

Ratnawati, D., Handayani, I., & Hadi, W. (2020). The Influence of the Question Card Assisted PBL Learning Model on the Mathematical Critical Thinking Ability of Junior High School Students. Edumatica : Journal of Mathematics Education, 10(01), 44–51.https://doi.org/10.22437/edumatica.v10i01.7683

Saputro, OA, & Rahayu, TS (2020). Differences in Effect of the Application of Project Based Learning (PJBL) and Problem Based Learning (PBL) Models Assisted by Monopoly Media on Students' Critical Thinking Ability. Scientific Journal of Education and Learning, 4(1), 185–193.https://doi.org/https://doi.org/10.23887/jipp.v4i1.24719

Setiawan, FA, Arisanty, D., Hastuti, KP, & Rahman, AM (2020). The Effect of Metacognitive Ability on Learning Outcomes of Geography Education Students. Indonesian Journal on Learning and Advanced Education (IJOLAE), 2(2), 82–90.https://doi.org/10.23917/ijolae.v2i2.9257

Suherman, Prananda, MR, Proboningrum, DI, Pratama, ER, Laksono, P., & Amiruddin. (2020). Improving Higher Order Thinking Skills (HOTS) with Project Based Learning (PjBL) Model Assisted by Geogebra. Journal of Physics: Conference Series, 1467(1), 012027.https://doi.org/10.1088/1742-6596/1467/1/012027

Supriyadi, 2011, Maintain / Service Steering System, Erlangga Toyota, Chasis Group Step 2 Training Manual, Toyota Publisher

Suratno, S., Kamid, K., & Sinabang, Y. (2020). THE EFFECT OF APPLICATION OF PROBLEM BASED LEARNING (PBL) LEARNING MODEL ON HIGH LEVEL THINK ABILITY (HOTS) VIEWED FROM STUDENT LEARNING MOTIVATION. JOURNAL OF MANAGEMENT EDUCATION AND SOCIAL SCIENCES, 1(1), 127–139.https://doi.org/10.38035/jmpis.v1i1.249

Triasningsih, E. (2019). Thinking HOTS in Social Science Problem Based Learning Methods. Journal of IPS Research and Education, 13(2), 1–6. https://doi.org/10.21067/jppi.v13i2.4743