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APPLICATION OF *THE PROJECT-BASED LEARNING* MODEL BASED ON LESSON STUDY TO IMPROVE STUDENTS' CRITICAL THINKING SKILLS

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ABSTRACT

This research aims to enhance critical thinking skills using the Lesson research-based project-based learning (PjBL) model in improving the critical thinking skills of grade VII students in social studies subjects at SMP Negeri 4 Ciawigebang. The theory supports this research. According to Trianto, which states that "the purpose of this PjBL method has the following objectives: 1) to provide broad insight into students when facing problems directly; 2) developing critical thinking skills and expertise in dealing with problems that are received directly". The problem addressed in this research is the low critical thinking ability of students, characterized by their dependence on reading books and a lack of initiative in solving problems independently. The research method employed was a quasi-experimental design with a non-equivalent control group. This research involved two groups of students: the experimental group, which received project-based learning (PjBL) based on Lesson research, and the control group, which used the lecture method. The analysis results showed a significant difference in critical thinking skills between the experimental and control groups. Thus, the research-based Lesson Project-based Learning (PjBL) learning model can be an effective alternative for developing students' critical thinking skills in secondary school.

Keywords: project-based learning; lesson study; critical thinking skills; independent curriculum

INTRODUCTION

Students in SMP Negeri 4 Ciawigebang, particularly those in grade VII, often lack confidence in their learning and exhibit a low level of critical thinking during the learning process, especially in social studies subjects. (Rahmaniar, 2020). This is due to the condition of students, where students in class VII B in semester 1 are students who transition from elementary school (SD) to junior high school (SMP) (Hasnunidah & Maulina, 2023). The difference in school level also entirely affects the learning patterns of students.

Student learning independence has also not been seen in the process of teaching and learning activities. (Mulyono et al., 2018; Sumbawati et al., 2020; Wege et al., 2022).

Students' activeness and critical thinking remain low, characterized by a lack of attention during learning, difficulty expressing their opinions, and a lack of initiative to ask questions. So that the learning process experiences problems. The learning model used by teachers still relies on conventional methods.

Students must be equipped with critical thinking skills during the learning process, as these skills are essential for solving problems in daily life. (Bangun & Pragholapati, 2021; Perdanasari & Sangka, 2021; Shanta, 2022). Howie posited that "critical thinking is considered the highest intellectual activity in human interaction, enabling people to participate in the decision-making process." (Fitriani & Istianti, 2017). This aims to prepare the younger generation to face all the demands and challenges of the 21st century. According to Chusni (2020) Priyadi (2018) defines critical thinking as logical and reflective thinking that focuses on making informed decisions. Critical thinking is an inseparable part of education, and it is an essential cognitive ability. There are five indicators of critical thinking ability, according to Ennis, including Providing a Simple Explanation (Elementary Clarification), Building Basic Skills (Basic Support), Concluding *(Inference),* Making Further Explanations *(Advanced Clarification),* Strategy and tactics *(Strategies and Tactics)*.

Lesson study is a collaborative approach to learning that originated in Japan in the early 1900s. In Japanese, the term *"Lesson Study" is known as "jugyokenkyu," which translates to "study of learning," composed* of the words "jugyo" (lesson) and "kenkyu" (research). Stepanek explained that a *Lesson study* is a collaborative process where a group of teachers identifies a learning problem and designs a learning scenario (stage *Plan*), learning students according to a scenario performed by one teacher. At the same time, the other observes (stage *Do*), reflects and evaluates (stage See), and revises the learning scenarios.

Perry et al. in Zubaidah (2017) Explained that *Lesson study* is one of the models of approach to professional development through "learning from practice." For *Lesson study*, teachers formulate long-term learning and development goals; collaboratively work on "learning research" to achieve learning objectives; observe, document, and discuss student responses to learning; and review the learning, as well as expand the learning approach. These activities, including planning, observation, analysis of student learning, and review of learning, form a cycle based on collaborative learning. The primary objective of the Lesson Study is to foster more active, critical, innovative, and engaging learning experiences for students.

As a model for professional development, *Lesson studies* have a positive impact on improving the quality of education through continuous collaboration and joint learning. (Nyang'au et al., 2018; Schlimbach et al., 2023; Schmid-Doyle, 2022; Woodlon, 2021). This is expected to be an effective effort in improving joint learning in Indonesia.

One of the learning models that can be used is the Project-based Learning (PBL) model (Diana & Sukma, 2021; Inayah et al., 2021; Nurhidayah et al., 2021; Simbolon & Koeswanti, 2020). Learning model *Project-based learning is a learning model initiated by John* Dewey and his followers. It is often also known as the concept of "learning while doing or *learning by doing*. That is, it means that learning is not only listening, reading, or

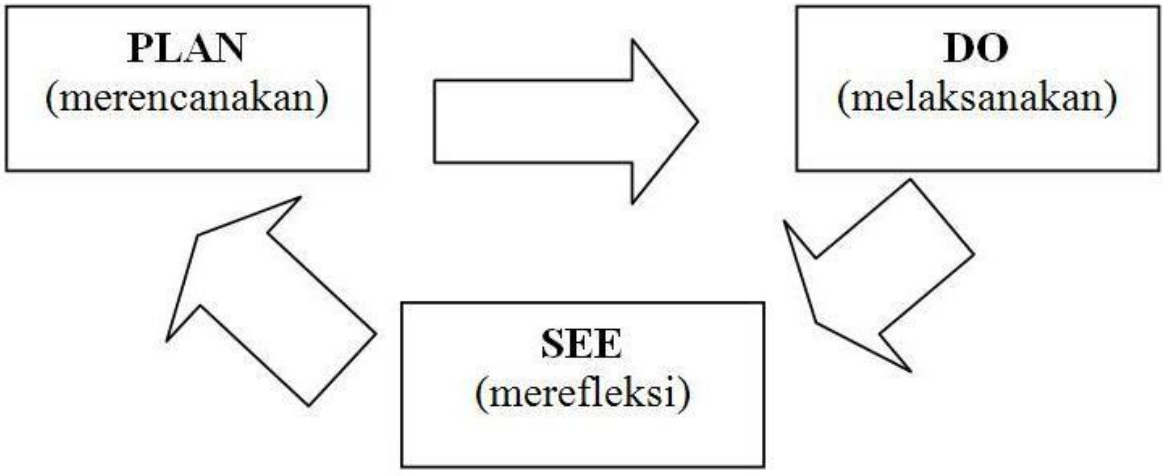
receiving knowledge, but learning can be done by doing something to make learning more meaningful". According to Trianto, it is stated that "the purpose of this PjBL method has the following objectives: 1) to provide broad insight into students when facing problems directly; 2) developing critical thinking skills and expertise in dealing with problems that are received directly".

The use of the PJBL model is combined with a learning approach, specifically Lesson Study, a classroom-based and collaborative approach to teacher professional learning that optimizes student learning services. Deep *Lesson Study involves three patterns: the planning pattern (Plan), implementation (red),* and reflection *(See)*. Several teachers join to conduct pre-learning planning and then carry out the learning in collaboration with teaching teachers and other observers. After completing the learning, the teachers gather again to evaluate, identifying the advantages and disadvantages of the previous learning, and the teacher makes improvements for subsequent learning. This research aims to enhance critical thinking skills through Project-based learning (PjBL) Lesson study on the critical thinking abilities of grade VII students in social studies subjects at SMP Negeri 4 Ciawigebang.

METHOD

Implementation Procedure: The lesson study is conducted in a series of activities known as cycles. Each cycle consists of three stages: the first stage, Plan (planning); the second phase, Do (implementation); and the third stage, See (reflection).

The implementation of the Lesson Study at SMP Negeri 4 Ciawigebang began with a discussion with partner teachers to analyze the problems that arose in the learning process.



picture 1. Flow of Lesson study activities at school

Following this, an in-depth analysis is conducted to identify the primary focus of the problem to be addressed through collaboration between the model teacher and other participating teachers who serve as observers. The main focus of the problem to be solved is to improve students' critical thinking skills.

The learning model being developed is Project-Based Learning (PBL). In its implementation, learning will utilize teaching materials in the form of packaged books and

interactive learning media, such as PowerPoint. The assessment instrument used consisted of 30 complex multiple-choice questions (PGK), divided into 15 pre-test questions and 15 post-test questions, to measure students' critical thinking skills. Projects that students will produce in groups include creating mind maps or concept maps, as well as designing infographics.

Data collection during the learning process is carried out through visual recording by trained multimedia operators. Multimedia operators were previously trained to capture activities that occurred during the learning process. The recording techniques carried out include:

The documentation process involves recording all activities carried out by model teachers and the involvement of observers during the implementation of *lesson studies*. The documentation includes the recording of the classroom used and the learning media that has been agreed upon by the model teacher and the observer, which is then used as an instrument to collect research evidence.

Observation Process → The Observer makes observations on student group discussions using observation assessment sheets that refer to indicators of collaborative learning, including visual, psychomotor, verbal, mental, and emotional activities. Additionally, observations of model teachers are conducted to evaluate the implementation of lesson study-based learning stages. Observation assessment sheets were distributed to observers to monitor student collaboration activities in group discussions. This sheet is in the form of a filling that is adjusted to the indicators that have been set.

RESULT AND DISCUSSION

Pretest Data

The initial test in this study was administered to two research classes, namely the control class and the experimental class before they received treatment. The questions provided for the pretest consisted of five questions, which were administered during one meeting. Since the researcher conducted three meetings with students, the total number of pretest questions was 15. Based on the analysis of the pretest data, the control and experimental classes are as follows:

Table 1 Initial Test Results (Pretest)

NO	Research Data	Experiment	Control
1	N	32	32
2	Max	80	73
3	Min	47	40
4	Range	33	33
5	Average	63	55
6	SD	11,180	10,466

Table 1 above shows that the pre-test results for the experimental class, which used the Project-Based Learning (PBL) model, and the control class, which used the lecture method, have different average scores after rounding. In the experimental class with several students as many as 32, an average of 63 with the highest score of 80 and the lowest score

of 47, as well as a standard deviation of 11,180, while the control class with the number of students taking the test as many as 32 students obtained an average of 55 with the highest score of 73 and the lowest score of 40, as well as a standard deviation of 10,466.

The results of the comparison of the pre-test of the experimental class using the Project Based Learning (PJBL) model with the control class using the lecture method can be seen in the following diagram:

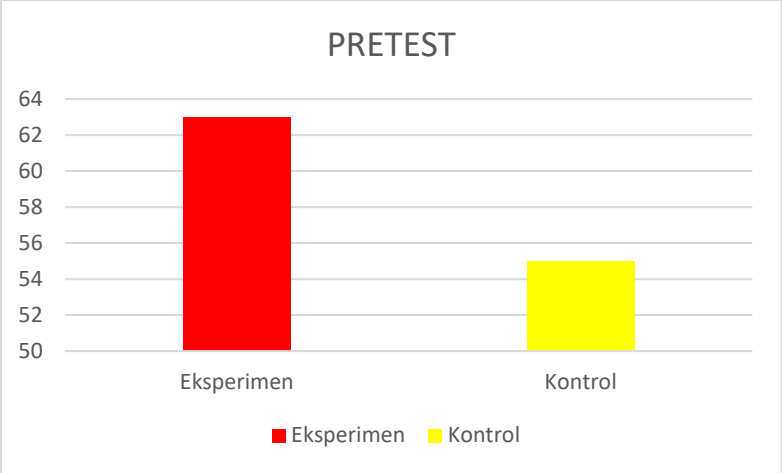


Diagram 1. Comparison of Experimental and Control Pretest Averages

Final Test Data (Postest)

Based on the processing of the data of the final test results (post-test) between the experimental class using the Project Based Learning (PJBL) model and the control class using the lecture method, data was obtained as in the following Table 3:

Table 2 Final Test Results (Posttest)

NO	Research Data	Experiment	Control
1	N	32	32
2	Max	100	93
3	Min	60	53
4	Range	40	40
5	Average	83	72
6	SD	11,530	11,871

Table 2 above shows that the post-test results between the experimental class, which used the Project-Based Learning (PBL) model, and the control class, which used the lecture method, have different average scores after rounding. In the experimental class with a total of 32 students, an average of 40 with the highest score of 100 and the lowest score of 60, as well as a standard deviation of 11,530, While the control class with the number of students who took the test as many as 32 students obtained an average of 72 with the highest score of 93 and the lowest score of 53, as well as a standard deviation of 11,871.

The results of the comparison of the pre-test of the experimental class using the Project Based *Learning (PJBL)* model with the control class using the lecture method can be seen in the following diagram:

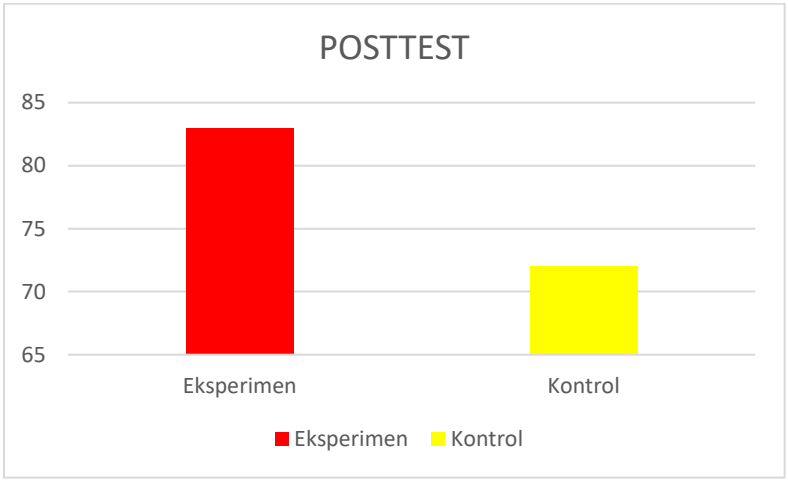


Diagram 2. Comparison of Experimental and Control Posttest Averages

Description of Critical Thinking Skill Improvement

The Gain value was obtained by subtracting the pre-test score from the post-test score to determine the improvement in critical thinking skills in the experimental class, which used the Project-Based Learning (PBL) model, and the control class, which used the lecture method. The summary of the N-Gain value is presented in Table 4.3 below:

Table 3. N-Gain Value

Class	Number of Students	Average N-Gain	Criterion
Experiment	32	0,55	Keep
Control	32	0,38	Keep

Table 3 above shows that, based on the N-Gain for the experimental class using the Project Learning Model (PJBL), the average inlet gain of 0.55 falls within the medium criteria. The control class that used the lecture method achieved an average gain value of 0.38, which falls within the Medium criterion.

The diagram of the comparison of the average gain value between the experimental class using the Project Based Learning (PJBL) model and the control class using the lecture method can be seen in the following figure:

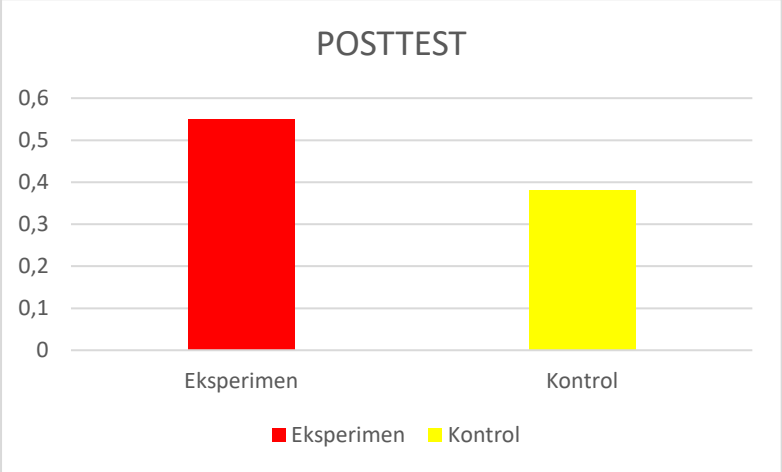


Diagram 3. Comparison of Experimental and Control N-Gain Averages

Discussion

Plan

The planning process for activities *Open Class* 1, 2, and 3 began with a discussion with partner teachers, which included preparing a schedule of monthly PE activities and conducting initial studies to analyze learning problems in schools. In the debate, partner teachers presented the results of the analysis related to issues that occurred in schools, including low student motivation to learn, shyness when expressing opinions, fear of making mistakes, limited critical thinking skills, inadequate problem-solving skills, and various other obstacles.

The model teacher for *Open Class* in cycles 1, 2, and 3 is Caecilia Dina Rosaline. The learning materials are tailored to the ongoing topic. Materials for *Open Class* Cycle 1 focus on the definition and types of needs. Cycle 2 discusses factors that affect needs, and Cycle 3 covers the types of tools for satisfying needs and the problems associated with human needs. The teaching modules that are prepared include learning objectives, materials to be taught, learning models applied, and assessment instruments.

The learning steps comprise three main stages: opening activities, core activities, and closing activities. The learning model applied is *Project-Based Learning* (PjBL), which is carried out by the syntax. This syntax encompasses basic questions, product planning, following up on the production schedule, monitoring project activity and development, testing results, and evaluating learning experiences. Teaching materials are arranged to support the learning process effectively. Learning media are prepared in the form of presentations made using Microsoft PowerPoint. In addition, learning instruments such as Student Worksheets (LKPD), *pretests and posttests, as well as assessment worksheets, are* designed to cover the cognitive, affective, and psychomotor aspects of students.

During the planning process, documentation for activities in Open Class cycles 1, 2, and 3 is also prepared. For Open Class cycles 1, 2, and 3, equipment for execution photos includes a handphone camera.

picture 2. Plan Activities at SMP Negeri 4 Ciawigebang

Do (Implementation)

Implementation of Open Class cycles 1 to 3 was carried out with model teacher Caecilia Dina Rosaline, utilizing the learning model of Project-Based Learning (PBL). The application of this model follows planning (Plan) that has been formulated in the learning design and adapted to the learning material.

The learning process begins with introductory activities, which include joint prayer, attendance, delivery of learning objectives through triggering questions, motivation, and implementation of a pretest To measure students' initial understanding of the material to be studied.

In the core activity, students are given pretest questions to assess their initial abilities before receiving an explanation of the material. The teacher then explained the subject matter, followed by providing group assignments using the PjBL model, which included mind mapping and infographics based on the material presented. Students gather information from various sources, structure their projects, and present them to the class.

The learning activity concluded with a closing activity, during which the teacher and students jointly formulated a conclusion. After that, students do the posttest, the teacher conveys an overview of the material for the next meeting, and the session is closed with a prayer.

picture 3. Open class activity at SMP Negeri 4 Ciawigebang

See (Discussion and reflection)

Activities *Are carried out after learning is over,* in cycles 1, 2, and 3. In this activity, model teachers share reflections on the implementation of learning. Furthermore, the observer presented the results of observations on the student group discussion process, including findings that can be used as material for future improvements to the learning process.

The model teacher and the observer then draw conclusions, which include identifying several problems encountered during the learning process. Some of the issues identified include that students tend to be shy about expressing their opinions in group discussions, resulting in them remaining silent.

1. Some students still lack focus in the discussion process due to a lack of understanding of the material.
2. Students often struggle to establish effective communication with their peers.
3. Students still struggle to express their opinions.
4. Some students do not contribute to the process of working on projects in groups; this is detrimental to their group members because it is difficult to work effectively without discussing together.
5. Students are not brave in presenting the results of their discussions because they think that the results of the debate are not optimal

The application of the learning model Project-Based Learning (PBL) during Open Class Cycles 1, 2, and 3 demonstrated significant development in students' critical thinking skills. They are becoming increasingly skilled in solving problems related to learning materials. Additionally, students showed increased confidence in expressing their opinions during group discussions and actively participated in their respective group activities.

Students' confidence also increased, especially when making presentations in learning. They began to focus on discussing and working together to complete the project given by the model teacher, showing better involvement in the learning process.

picture 4. See activities at SMP Negeri 4 Ciawigebang

CONCLUSION

Lesson study activities are applied in the learning process for students in class VII B SMP Negeri 4 Ciawigebang by implementing plan-do-see where the learning model applied, namely the Project-based learning (PjBL) learning model, can improve students' critical thinking skills, meaning that students' critical thinking skills have improved by applying the project-based learning (PjBL) model based on lesson study.

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