



A STUDY OF PBL-BASED LEARNING FOR INCREASING STUDENT'S CRITICAL THINKING SKILLS AT STATE MADRASAH ALIYAH

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Abstract :

This research is motivated by the ability of students to understand and apply the concept of static fluid. This study aimed to describe the PBL, improve critical thinking skills, and describe the increased ability to understand the concept of static fluid in class nine students at MAN2 Indragiri Hilir with the application of PBL. This study uses a descriptive qualitative approach to the type of Classroom Action Research. The action given was in the form of applying a PBL, carried out in two cycles. The activities of each cycle include planning, action, observation, and reflection. The subjects in the study were class nine students at the MAN 2 Indragiri Hilir, with a total of 13 students. The research instruments included: lesson plans and worksheets, PBL implementation sheets, field note formats, process skills observation sheets, and end-of-cycle tests. The study results show that applying the PBL can improve students' critical thinking skills at MAN 2 Indragiri Hilir. The analysis results show an increase in critical thinking aspects. Namely, in the first cycle, the average value is 80.80 with good criteria, and the second cycle has an average value of 93.00 with very good criteria.

Keywords: Critical Thinking Skills; Increasing Student's; PBL-Based Learning

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INTRODUCTION

The world of education is an important aspect that needs attention. Education is one of the fundamental things that makes individuals and groups able to have adequate scientific development. "Education is a fundamental thing in human life. Education has an important role for the formation of individuals who have the will to continue working to become the next generation of the nation". (Astalini et al., 2019). Indonesia's national education on the curriculum. Increasingly, curriculum-based results-based curriculum programs are subject to comparisons in international and national assessment studies. (Astalini et al., 2019).

Education in Indonesia has been well integrated and needs further development. Continuity of education should be closely related to the curriculum used. The educational curriculum used is adjusted to the existing school. Often changes in the curriculum in schools

are caused by whether it is appropriate or not in accordance with the curriculum when it is implemented. The current curriculum used is the revised 2013 curriculum, so students are expected to have a scientific attitude in learning. (Astalini et al., 2018). "Science education is important in developing the character of the nation's children because of the consistency of the moral ethics content that students are relevant to the teachings of Kihajar Dewantoro's ancestors, namely "ing ngarso sung tulodho ing madya to develop the intention of tut wuri handayani". (Darmaji et al., 2018).

The Covid-19 outbreak has brought many changes in various aspects of life, both positive and negative changes, including in the field of education. Before the pandemic, the world of education in Indonesia was not very familiar with the online learning process, various online learning platforms, learning through electronic media, virtual face-to-face rooms, and various terms used in the distance learning process. When the pandemic broke out, the learning process that was usually carried out face-to-face in the room was replaced by a virtual learning process, using computers and gadgets using an internet connection. This of course requires all parties involved in the education sector to make breakthroughs as alternative solutions so that the learning process continues as it should.

Learning in principle carries out learning so that students find problems to be studied, and develop plans and carry out learning in order to be able to solve or find solutions to problems that have been found (Suwarno et al. 2022). Study results Programme for Internasional Study Asessment (PISA) also shows that the percentage of Indonesia is in 43 position out of 45 participating countries (Kemendikbud, 2015). Learning physics as a process, attitude and application is not touched in learning so that students' critical thinking skills are low, globally the low level of critical thinking skills can be seen in the results The Trends Internasional Mathematics and Science Study (TIMSS) reported by the Kemendikbud (2011) in 2007 that Indonesia was in a low position, namely 35 out of 49 countries. The cause of the low critical thinking skills of students is due to teacher-centred learning, then the lack of understanding and readiness of teachers to implement innovative learning models so that teachers still teach in traditional ways, or teachers already use learning models but not according to needs learners. Astalini et al., (2019), "Conversely, non-success will lead to low learning outcomes in students of science. It is arguable to say that attitudes toward science is a form of regularity to behave toward natural science learning systematically and naturally of facts, concepts, principles, laws that are objectively tested".

Priawasana, E and Waris (2019) stated that in efforts to improve students' critical thinking skills, what needs to be done is to use several variations of learning models that are more fun and which make it easier for students to understand the context of the material being taught. The model that can be applied in improving students' critical thinking skills in science subjects is the PBL learning model. Problem-based learning is a learning model that focuses on teaching and problem-solving skills through the stages of the scientific method, namely using group discussions by being given problem cards for each group (Madroji, Zulaiha, F, & Faizah. 2019).

PBL is a learning model that uses real world problems as a context for students to learn to think critically and creatively (Ganeswati, 2019). Problem Based Learning (PBL) is a student-centered model by confronting these students with the various problems they face in their lives (Gusliani et al., 2021). Indonesian people are formed through independent education, namely those who always have initiative without having to wait for instructions, always think creatively, always innovate and work and have noble character, so that a generation that is intelligent, pious and with character is born (Suwarno et al., 2022).

Currently the development of the world leads to critical thinking skills. Critical thinking skills are very important in facing the era of globalization. This has an impact on the teaching and learning process in schools, students are expected to have critical thinking
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skills. In physics learning activities students' skills in critical thinking are very necessary, because in a physics lesson includes theories related to natural conditions and everyday life. After getting physics learning, it is hoped that students will not only be able to understand physics theories and principles, but can bring up critical thinking skills (Madroji, Zulaiha, F, & Faizah, 2019). Critical thinking skills train students in making decisions from various perspectives carefully, thoroughly, and using logic and responsibility. One teaching model that can be applied to improve students' critical thinking skills is the Problem Based Learning (PBL) learning method. According to Nurfiyanti et al., (2018) applying the right PBL model can improve students' thinking skills.

The purpose of this study was to find out whether there was an increase in the critical thinking skills of class XI students on Static Fluid Material at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir by using problem-based learning (PBL). Class XI students at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir need to improve their critical thinking skills in order to be able to answer or find alternative solutions to various problems in the learning process. With the application of the problem-based learning model (PBL), it is hoped that the success of the learning process will be more enjoyable, meaningful and at the same time familiarize students with being able to represent problems that exist in the real world, instill a sense of responsibility in students, besides that by conducting an assessment of the group, it will make students in groups really work very well together for the benefit of the group in order to achieve optimal success for both the individual and the group.

The application of problem-based learning (PBL) in the Physics learning process on Static Fluid material that is applied to Class XI students at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir, using the stages in PBL as expressed by the PBL Syntax consists of: (1) students are presented with a problem, (2) students discuss problems in the PBL tutorial in a small group, (3) students are involved in independent studies to solve problems outside of teacher guidance, (4) students return to the PBL tutorial, sharing information, (5) students present solutions to problems, and (6) students review what they learn (Huda: 272), as shown in the table below.

Table 1.1. Problem Based Learning Stages

PBL syntax	Activity
1. students are presented with a problem	The teacher shows a video about an example of applying static fluid in everyday life, students look enthusiastic about watching the video displayed by the teacher.
2. students discuss problems in PBL tutorials in small groups	Students identify problems regarding examples of the application of static fluids in everyday life and formulate in the form of hypotheses, and discuss with the group the answers to the questions given.
3. students engage in independent study to solve problems outside of teacher guidance	Students provide answers to the problems shown through the video with their groups
4. students return to the PBL tutorial, sharing information with each other	Monitoring students during group discussions when sharing information with each other to minimize errors in solving a given problem
5. students present	The process of proving the right or wrong

PBL syntax	Activity
solutions to problems	hypothesis proposed
6. students review what they learned	The process of drawing conclusions from the activities that have been carried out in relation to examples of the application of static fluids in everyday life.

From the stages of implementing the problem-based learning model, it can be seen that students are enthusiastic in carrying out the learning process, starting from the process when the teacher gives basic questions about fluid, students are excited and enthusiastic about responding to this. When students are divided into several heterogeneous groups, most of the students express ideas that will be given in the form of problems that have levels of complexity, from easy to more difficult levels. There was also good cooperation between members in the group to answer questions in the form of questions that had been discussed with the group.

RESEARCH METHOD

The research method used in this research is classroom action research (CAR). This research was conducted at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir in the Odd Semester of the 2022/2023 Academic Year. The time for carrying out this research from the preparation stage to the final data collection stage starts from August to November 2022. The subjects in this study were class XI students at Indragiri Hilir State Madrasah Aliyah (MAN) 2 for the 2022/2023 academic year with a total of 13 students. The following is a description of the class action research cycle according to Kemmis & Mc Taggart (Taniredja et al., 2013).

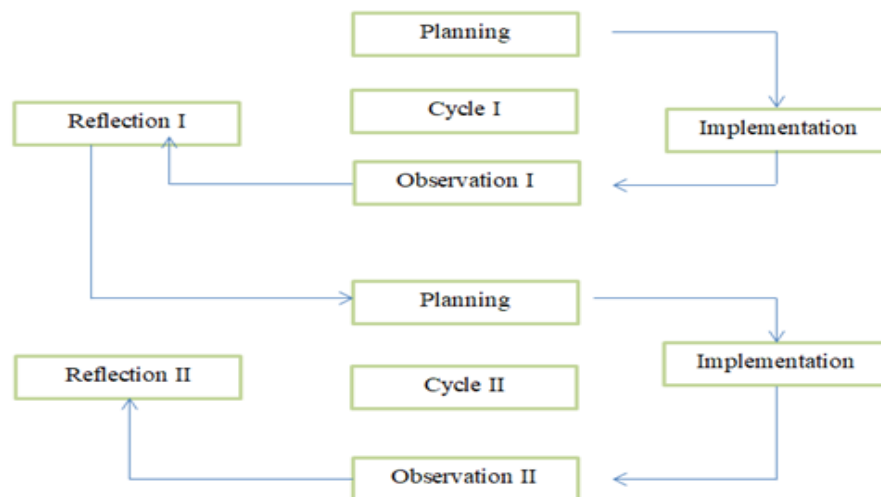


Figure 1. Kemmis and McTaggart Model (Taniredja et al, 2013)

RESULTS AND DISCUSSION

RESULTS

Based on the results of research that has been carried out in class XI at the State Madrasah Aliyah (MAN) 2 Indragiri Hilir which begins at the first meeting in August 2022 to November 2022 which focuses on increasing the critical thinking of class XI students on *A Study Of ... (Alfika Destianti, and Rizal Antoni) pp:87-94*

Static Fluid Material at the State Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir by using Problem Based Learning (PBL) obtained the following results.

Preliminary Data Findings

In the initial observation stage to detect the presence or absence of learning problems in class XI Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir, the researcher made observations in class about learning processes and activities. It was found that so far learning in the classroom was teacher-centered, conventional learning strategies were dominated by lecture methods, lack of contextual learning activities, students were not fully active in discussions, question and answer, and were not confident when asked by the teacher to make presentations.

Based on the findings, researchers made improvements to learning by applying the Problem Based Learning (PBL) Model. The problem-based learning model or Problem Based Learning (PBL) can be used by teachers to develop students' skills in their ability to think critically as well as possible (Agnezi, 2020). The learning model that favors students to increase critical thinking in learning activities is by applying a Problem Based Learning (PBL) model, especially in Static Fluid material in Class XI Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir.

Cycle I

In cycle I, data obtained from observations of students' critical thinking are presented in the following table.

Table 2. Results of the Analysis of Students' Critical Thinking Cycle I Using Problem Based Learning (PBL)

Students' Critical Thinking	PBL phase	(%)
- Listen to the teacher's explanation	Problem Orientation	85,00
- Understand the formulation of the problem from the teacher		
- Make a temporary answer		
- Write down the answers on the LKPD	Organizing students to learn	80,00
- Join in groups		
- Choose a group leader		
- Make observations	Guiding individual as well as group investigations	80,00
- Write down the observations		
- Read teaching materials		
- Discuss with fellow group members	Create, Develop and present the work	81,00
- Checking the results of the answers on the LKPD		
- Make reports in the form of LKPD answer sheets and in the form of papers and power points along with presentations		
- Deliver questions/responses to the results of other group discussions	Analyze and evaluate the problem solving process	78,00
- Answer or respond to comments of other groups		
- Deliver conclusions from the results of activities on LKPD		
Percentage of Students' Critical Thinking on the application of PBL-based learning		80,80

Based on the data in Table 2, information is obtained that students' critical thinking skills are not maximized. From the indicators of critical thinking skills observed with 5 items, only 80, 80% were implemented even though they were in the good category but not optimal. The ability of students to analyze and evaluate problems regarding static fluids shows a good improvement. Based on the success indicators of critical thinking skills with PBL-based learning it is deemed necessary to proceed to cycle II. It is considered necessary to proceed to cycle II with the consideration that: 1) there are several indicators of activity \leq 80.80%. 2) to get better and more valid research results with poor indicator improvements.

Cycle II

In cycle II, data obtained from observations of students' critical thinking are presented in the following table.

Table 3. Results of Analysis of Students' Critical Thinking Cycle II by Using Problem Based Learning (PBL)

Students' Critical Thinking	PBL phase	(%)
- Listen to the teacher's explanation	Problem Orientation	97,00
- Understand the formulation of the problem from the teacher		
- Make a temporary answer		
- Write down the answers on the LKPD	Organizing students to learn	91,00
- Join in groups		
- Choose a group leader		
- Make observations	Guiding individual as well as group investigations	93,00
- Write down the observations		
- Read teaching materials		
- Discuss with fellow group members	Create, Develop and present the work	95,00
- Checking the results of the answers on the LKPD		
- Make reports in the form of LKPD answer sheets and in the form of papers and power points along with presentations		
- Deliver questions/responses to the results of other group discussions	Analyze and evaluate the problem solving process	89,00
- Answer or respond to comments of other groups		
- Deliver conclusions from the results of activities on LKPD		
Percentage of Students' Critical Thinking on the application of PBL-based learning		93,00

The results of observing students' critical thinking skills in cycle II showed very good results, from the 5 items observed with the five indicators of problem-based learning stages or Problem Based Learning (PBL) a percentage value of 93.00 was obtained.

Table 4. Recap of Observation Results of Students' Critical Thinking Ability Using Problem Based Learning (PBL)

Critical Thinking Ability Using PBL-Based Learning	Category	%
Cycle I	Good	80,80
Cycle II	Very Good	93,00

DISCUSSION

Based on the results of the research that has been done, and the results of observational data processing, the Improvement of Critical Thinking Skills by applying the PBL learning model to static fluid material has increased, as presented in the following diagram.

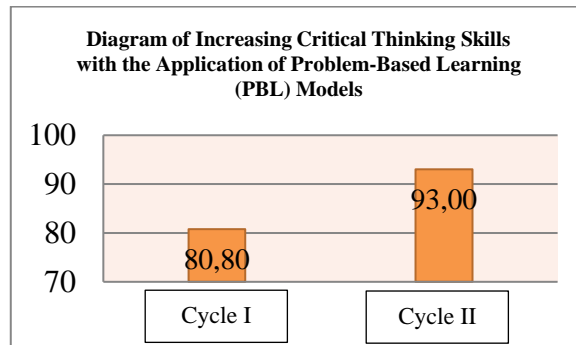


Figure 2. Diagram of Increasing Critical Thinking Skills with the Application of Problem Based Learning (PBL) Models

From the results of the analysis in the diagram above, it can be seen that by applying the Problem Based Learning (PBL) model to static fluid material, it is able to consistently improve students' critical thinking skills. It can be seen that there is an increase in the average percentage from cycle I to cycle II. From the explanation above it can be seen that the problem-based learning model (PBL) plays a role in improving critical thinking skills, creative, and collaboration abilities of Class XI students at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir. This is in accordance with research conducted by Windari, Yanti (2021: 63) which states that problem-based learning provides conditions for improving critical and analytical thinking skills and solving complex problems in real life so that it will create a culture of critical thinking in students. And Gusliani, E., et al. 2021: 164 states that through learning using the Problem Based Learning (PBL) model it is easier for students to develop their critical thinking skills, to increase students' critical thinking skills can use the Problem Based Learning (PBL) model in the student learning process.

Students' critical thinking skills through problem-based learning give good and very good results. So based on the implementation of problem-based learning that has been done, it can be concluded that Problem-Based Learning (PBL) can improve the critical thinking skills of Class XI Students on Static Fluid Material at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir.

CONCLUSION

Based on the results of the research and discussion previously described, the conclusions were obtained: (1) the application of the problem-based learning model or Problem Based Learning (PBL) in class XI Static Fluid Material at Madrasah Aliyah Negeri (MAN) 2 Indragiri Hilir is good and very good, marked by an increase in students' critical thinking skills during the learning process, and (2) the use of problem-based learning models or Problem Based Learning (PBL) can improve students' critical thinking skills with an average percentage score in cycle I is 80.80% and in cycle II is 93.00%.

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