# IMPROVING EFFORTS OF CRITICAL THINKING OF STATISTICS MATERIAL USING PROBLEM BASED LEARNING MODEL IN FIFTH GRADE MELUNG ELEMENTARY SCHOOL

**Laelly Wahyuningsih, Wahyudi**
Professional Education Study Program for Prajabatan Elementary School Teachers
2018 Satya Wacana Christian University Salatiga
e-mail: laellyw@gmail.com

**Abstract :The purpose of this study was to describe the application of the Problem Based Learning model to improving student's critical thinking skills on Mathematics subjects in the fifth grade statistics material at Melung Elementary School.** Problem Based Learning is used to stimulate problem-oriented critical thinking. Through the application of Problem Based Learning, students are expected to be able to find solutions to problems discussed in the learning process. The method used is Classroom Action Research (CAR). There were 66.6% of the students in the "fairly critical" category while the other 33.30% were in the "not critical" category. After the actions in cycle I and cycle II, it was found that students who were included in the "very critical" category from the original ones did not increase to 29%, for the "critical" category from the original ones that did not increase to 58% of students. Then it was concluded that the Problem Based Learning model was able to improve students' critical thinking skills in Mathematics subject matter in the fifth grade statistics material at Melung Elementary School.

**Keywords :** *Problem Based Learning, critical thinking*

**Abstrak :Tujuan penelitian ini ialah untuk mendeskripsikan penerapan model *Problem Based Learning* dalam meningkatkan kemampuan berpikir kritis peserta didik pada mata pelajaran Matematika materi statistika kelas V SD Negeri Melung.** *Problem Based Learning* digunakan untuk merangsang berpikir kritis yang berorientasi masalah. Melalui penerapan *Problem Based Learning* ini, peserta didik diharapkan dapat menemukan pemecahan masalah yang dibahas dalam proses pembelajaran. Metode yang digunakan adalah Penelitian Tindakan Kelas (PTK). Ada 66,6% peserta didik dalam kategori "cukup kritis" sedangkan 33,30% lainnya ada dalam kategori "tidak kritis". Setelah dilakukan tindakan dalam siklus I dan siklus II ditemukan bahwa mahasiswa yang termasuk dalam kategori "sangat kritis" dari yang semula tidak ada meningkat menjadi 29%, untuk kategori "kritis" dari yang semula tidak ada meningkat menjadi 58% peserta didik. Maka disimpulkan bahwa model *Problem Based Learning* mampu meningkatkan kemampuan berpikir kritis peserta didik dalam mata mata pelajaran Matematika materi statistika kelas V SD Negeri Melung.

**Kata Kunci :** *Problem Based Learning, berpikir kritis*

## INTRODUCTION

The need for mathematics now and in the future is not only for daily needs, but also in the world of work and to support the development of science. At the age of elementary school students (7-8 years to 12-13 years), according to Piaget's cognitive theory is included in the concrete operational stage. Based on this cognitive development, elementary school age children generally have difficulty in understanding abstract mathematics. Because the extractiveness of mathematics is relatively not easy to understand by elementary school students in general (Ahmad Susanto, 2013: 183-184)

Problem Based Learning learning model is learning that presents contextual problems so that it provides an impetus to learn. Arends (2008: 41) that problem-based learning is used to support high-level thinking in problem-oriented situations. The role of Problem



p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

Based Learning teachers is to offer various problems, provide questions, and facilitate investigation and dialogue. According to Suyadi (2013: 130) said that problem-based learning involves students in the process of active and collaborative learning, and is centered on students, so that they are able to develop problem solving skills independently. Through the problem based learning model, it is expected that students can formulate and find the correct concept of the problem given.

Opinions from experts can be concluded that the Problem Based Learning model is a series of learning activities that make "problems" as key words in learning. The problem used is part of the problems that exist in everyday life. Students can develop their thinking power to find solutions to these problems. Problem Based Learning is one of the innovative models, teachers can increase the activity of students by giving real problems so that students can have skills in solving problems.

**Problem Based Learning Model**

a. The purpose of the Problem Based Learning Model.

Each learning model has its own objectives related to the Problem Based Learning model with problem solving skills. Arends (2008: 52) explained that:

1. Improve intellectual and investigative skills
2. Understanding the role of adults
3. Helping students to become independent students.

b. Steps of the Problem Based Learning Model

Learning models have learning steps According to Arends (2008: 57) suggest that the steps of Problem Based Learning are as follows:

Phase 1 Orient the problem to students.

The teacher discusses the objectives of the lesson, describes various important logistical needs and motivates students to engage in problem solving activities

Phase 2 Organize students to research.

The teacher helps students to define and organize learning tasks related to the problem.

Phase 3 Helps independent and group investigations.

The teacher encourages students to get the right information to carry out experiments, and look for explanations and solutions

Phase 4 Develop and present artifacts and exhibits.

The teacher helps students plan and prepare appropriate artifacts, such as reports, video recordings, and models, and helps them to convey it to others.

Phase 5 Analyzes and evaluates the problem solving process.

The teacher helps students to reflect on their investigations and the processes they use.

c. The advantages and disadvantages of the Problem Based Learning Model

The Problem Based Learning Model has several advantages and disadvantages. Excellence according to Suyadi (2013: 142). Problem Based Learning can be concluded that the model can increase the activeness of students during learning, so students do not just listen and record the teacher's explanation. Students can also practice the ability of collaboration through group discussion activities and develop the ability to think critically in solving problems.

**Critical Thinking Ability**

**a. Definition of Critical Thinking**

Thinking is an activity that humans always do, even when they are asleep. Critical thinking described by Susanto (2015: 121) is critical is an activity through the way of thinking about ideas or ideas related to the concepts given or problems presented. According to Santrock (2008: 259),



p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

critical thinking is reflective and productive thinking, and involves evaluating evidence. Through critical thinking students can develop their ideas so they can provide tangible evidence.

Critical thinking is the key to understanding a science. Johnson (2007: 183) critical thinking is a process that is directed and clearly used in mental activities such as solving problems, making decisions, persuading, analyzing assumptions, and conducting scientific research. Liliasari (Tawil 2015: 8) suggests that critical thinking is to analyze arguments and generate insight into each meaning and interpretation, to develop a cohesive and logical pattern of reasoning that understands the assumptions and biases underlying each position. The critical thinking skills possessed by students can be used to solve problems that exist in everyday life.

Critical thinking ability is very necessary to analyze a problem until the stage of finding a solution to solve the problem

**b. The Purpose of Critical Thinking**

The purpose of critical thinking according to Sapriya (2011: 87) is to test an opinion or idea, including in this process to do consideration or thinking based on the opinions proposed. These considerations are usually supported by criteria that can be justified.

The ability to think critically can encourage students to propose new ideas or ideas about the problems around them. Learners can be trained how to select various opinions, so they can distinguish which opinions are relevant, which opinions are correct and which opinions are not right. Developing critical thinking skills of students can help students draw conclusions by considering data and facts in the field.

**c. Characteristics of Critical Thinking**

There are certain characteristics that can be observed to find out how a person's ability to think critically. The following are characteristics of critical thinking according to Wijaya (2010: 72), namely, 1) Know in detail the parts of the whole. 2) Clever to detect problems. 3) Able to distinguish ideas that are relevant to irrelevant ones. 4) Able to distinguish facts from fiction or opinions. 5) Able to identify differences or information gaps. 6) Can distinguish logical and illogical arguments. 7) Able to develop data assessment criteria or standards. 8) Like collecting data or factual verification. 9) Can distinguish between constructive and destructive criticism. 10) Able to identify multiple perspectives that are related to data.

From the background of the above problems, the main study of this research is "Is the application of the Problem Based Learning model that can improve students' critical thinking skills in the Statistics SD Melung material?". To make it easier for writers to find research data, it is necessary to display several research questions around the issue, namely:

1. What is the teacher's activity in managing learning by applying the Problem Based Learning model to statistical material in the fifth grade of Melung Elementary School?
2. How is the activity of students during the learning process by applying the Problem Based Learning model in statistical material in the fifth grade of Melung Elementary School?
3. What are the students' critical thinking abilities after learning is done with the Problem Based Learning model in the fifth grade statistical material at Melung Elementary School?

The general objective is to find out the application of the Problem Based Learning model that can improve the



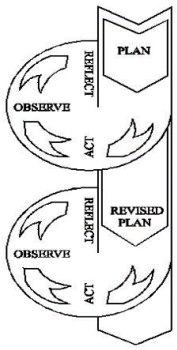
p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

critical thinking skills of fifth grade students at Melung Elementary School. The specific objectives expected to be obtained through this research are:

1. To find out the teacher's activities in managing learning by applying the Problem Based Learning model to statistical material in the fifth grade of Melung Elementary School.
2. To find out the activities of students during the learning process by applying the Problem Based Learning model to statistical material in the fifth grade of Melung Elementary School.
3. To find out critical thinking skills after applied learning with the Problem Based Learning model in statistical material in the fifth grade of Melung State Elementary School.

## METHOD

The research model that will be carried out by the researcher is a class action research model that adopts a class action research design from Kemis and McTaggart. The design of classroom action research according to Kemis and McTaggart in Tampubolon (2013: 27) in each cycle has 4 stages, namely: (1) planning of action (2), implementation of action (3), (3) observation / observation (observing ), and (4) reflection (reflecting). After reflection is carried out at the end of each cycle, after that it is continued again starting from the initial step, namely planning in the next cycle. The following is a picture of the cycle of classroom action research proposed by Kemmis and McTaggart.




Picture. 3.1 Action Research Process Kemmis & McTaggart (1982: 8)

Class action research to be carried out, in its implementation will be in accordance with existing rules. This class action research in each cycle will go through 4 stages.

According to Suharsimi (2006) classroom action research is an observation made on the teaching and learning process in the form of an action, which is deliberately raised that occurs in a class simultaneously. The research procedure consists of 4 stages, namely stages namely planning (planning), action (action), observation (observation), and reflection (reflective). The implementation of data collection in this study was conducted in two rounds and each round in this study followed the flow of the action research design. The outline of the study was arranged according to the class action research plan (CAR) in the form of a chart as described as follows:

### 1. Action Plan

At this stage the lecturer as a teacher at this stage prepares RPP and teaching materials in the form of modules and student worksheet, observation sheets for implementing Problem Based Learning.

### 2. Implementation of Action

The action in the first cycle was carried out in one meeting. The action stage carried out by the lecturer in this case is the researcher using the PBL model. The learning process is carried out according to the schedule of Mathematics subjects formed by groups consisting of 3-4 students. The material that will be given is in the form of case studies about the material of daily life regarding statistics. The actions taken in first cycle are:

a. Apperception (+ 15 minutes)
   - Guiding prayers in accordance with their respective religions
   - Providing opportunities for students to explore information



p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

- Orient the problem to be solved in groups
- Communicate the purpose of product learning, process, psychomotor, character behavior and social skills

b. Implementation of Activities (+ 70 Minutes)
- Organizing students to learn by providing student worksheet.
- Reveal things that are not understood in the student worksheet and help friends who have difficulties.
- Solve selected problems
- Conducting a step-by-step investigation begins with the formulation of the problem
- Formulate a hypothesis on the formulation of the problem that has been made
- Test the hypothesis that has been formulated
- Develop and present the results of the discussions that have been made
- Serve the results of the discussion responsibly

c. Closing (+ 20 minutes)
- Together analyze and evaluate problem solving
- Give appreciation and feedback on the work of students

**3. Observation**

Observations are made during the learning process by using the prepared observation sheet and recording events that are not contained in the observation sheet. The things observed during the learning process are learning activities during the implementation of learning.

**4. Reflection**

At this stage the teacher conducts an evaluation of the implementation of the action in the first cycle which is used as material for consideration of the next cycle of learning planning. If the expected results have not been achieved, then improvements will be made to the second cycle and so on.

## DISCUSSION

Based on preliminary observations obtained an overview of the conditions of learning in the fifth grade of Melung Elementary School, statistical material was delivered by using active learning methods and utilizing available media in the classroom. Based on the results of preliminary observations, it was seen that they were still unable to provide case examples in the environment, students were less interested, shy about asking questions and expressing their opinions and lack of interest in doing the assignments given. At the time of discussion, not understanding what was conveyed by other groups tended to look noisy themselves.

This condition shows students have not developed critical thinking activities. Students do not understand the material delivered by the teacher and the learning outcomes are not maximal. Based on the conditions and the initial data, action is needed to assist in understanding the material to improve students' critical thinking skills. The steps taken in this study are by applying the PBL model which is expected to increase the active role of students in learning so that they can improve students' critical thinking skills. The following are the results of preliminary observations regarding critical thinking skills in fifth gradestatistical material.

**Table 1.** Classification of Early Critical Thinking Abilities

| Score | Classification | Total of student | Percentage |
|---|---|---|---|
| 81-100% | Very critical | 0 | 0% |
| 63-80% | Critical | 0 | 0% |
| 43-62% | Rathercritical | 16 | 66,6% |
| 25-42% | Less critical | 8 | 33,30% |



p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

**First Action Research Cycles Results**

The activities carried out during the learning process in the first cycle include the stages of planning, action, observation and reflection outlined as follows:

**a. Planning**

In the first cycle the researcher delivered material about the concept of "statistics". In this stage, the learning objectives to be achieved are implemented by applying a statistical problem-based learning model to improve critical thinking.

**b. Acting**

The implementation phase in the classroom action research phase begins with giving apperception as an effort to provide stimuli to students. The learning objectives to be achieved are delivered. Next, the basic concepts of elementary school statistics are conveyed for 15 minutes. In this activity, learning scenarios regarding the implementation of problem-based learning models, namely by case discussions in groups to explore problems in the realm of problems in daily life regarding statistics.

The group discussion lasted 30 minutes and each group presented the results of the discussion. Each group representative presented the results of the discussion, began to be guided by students in expressing ideas or opinions, and questions. During the discussion it is expected that students develop critical thinking skills.

**c. Observing**

During the first cycle, there were observed critical thinking skills for 4 groups. Based on the results of the discussion of each group written on the discussion worksheet and during the implementation of learning it can be concluded that students' critical thinking skills are included in the fairly critical category with a percentage of 54.15% and a critical category with a percentage of 45.8%. The following are the results of observations in the first cycle regarding the critical thinking skills of students in mathematics learning statistical material

**Table 2**. Classification of Cycle I Critical Thinking Ability

| Score | Classification | Total of student | Percentage |
|---|---|---|---|
| 81-100% | Very critical | 0 | 0% |
| 63-80% | Critical | 11 | 45,85% |
| 43-62% | Rathercritical | 13 | 54,15% |
| 25-42% | Less critical | 0 | 0% |

**d. Reflection**

Based on predetermined indicators, students' critical thinking skills during learning need to be improved because they are included in the "critical enough" category with a percentage of 54.15% and "critical" category of 45.8%. Therefore, the researchers planned the following actions in the second cycle because in the first cycle they had not reached the specified target according to the available indicators.

**Second Action Research Cycles Results**

**a. Planning**

In the second cycle, material about the concepts of "diagram, mean median and mode" was delivered. In this stage the learning objectives to be achieved are applying a problem-based learning model to improve critical thinking. Teaching material used aims to provide knowledge and insight into the material.

**b. Acting**

At the stage of implementation in

p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295

the phase of classroom action research the researcher starts the material by giving apperception as an effort to provide stimuli to students to be better prepared in learning. Learning objectives to be achieved and material topics delivered in 15 minutes. In this activity, learning about the implementation of problem-based learning models, namely by case discussions in groups to explore problems in daily life regarding statistical material.

The group discussion lasted 30 minutes and each group presented the results of the discussion in front of the class, each group representative came to the front of the class randomly. Each group representative presented the results of the discussion, researchers began guiding students in expressing ideas or opinions, and questions.

**c. Observing**

During the second cycle, researchers observed critical thinking skills in 4 groups. Based on the results of the discussion of each group written on the discussion worksheet and during the implementation of learning it can be concluded that students' critical thinking skills fall into the category of "fairly critical" with a percentage of 12.5%, "critical" category with 58.3% and category " very critical "with a percentage of 29.16%. While for the "less critical" category there is absolutely nothing. The following is the result of observations in the second cycle of the students' critical thinking skills in statistical material.

## CONCLUSION

Based on the results of research and discussion, it can be concluded that learning using the PBL model is able to improve students' critical thinking skills in the eyes of statistical learning at Melung State Elementary School. This can be seen from the results of the average percentage of critical thinking skills observed in the first cycle to the second cycle which has increased to reach the indicator of success.

Based on the results of this study, it can be suggested that it is necessary to try to use other learning models such as problem posing and problem solving and in implementing PBL models in order to improve students' critical thinking skills should consider the suitability of the material.

## BIBLIOGRAPHY

Arends. 2008. *Learning to teach*. Yogyakarta: Pustaka Pelajar.

Johnson, EB. 2007. *Contextual Teaching and Learning Menjadi Kegiatan Belajar Mengasyikan dan Bermakna. Bandung*: MLC.

Santrock, John W. 2011. *Psikologi Pendidikan*. Jakarta : Kencana.

Sapriya. 2011. *Pendidikan IPS. Konsep dan Pembelajaran.* Bandung : Rosdakarya

Suharsimi, A. (2006). Prosedur penelitian suatu pendekatan praktik. *Jakarta: Rineka Cipta*.

Susanto, Ahmad. 2016. *Teori Belajar & Pembelajaran di Sekolah Dasar*. Jakarta : Kencana Prenada Media Group.

Suyadi. 2013. *Strategi Pembelajaran Pendidikan Karakter*. Bandung: PT. Remaja Rosdakarya Offset.

Tawil. 2015. *Ketrampilan-ketrampilan dan Implementasi Dalam Pembelajaran IPA*. Makasar: Badan Penerbit UNM.

Wijaya, C. 2010. *Pendidikan Remidial Sarana Pengembangan Mutu Sumber Daya Manusia. Bandung: PT Remaja Rosdakarya*



p-ISSN: 2355 - 1739
e-ISSN: 2407 - 6295