

# Implementation Of Tri N-Based Problem Based Learning Model On Improving The Ability To Solve Mathematics Problems In Grade IV Elementary School

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## 1. Abstract

In mathematics learning activities, the traveling material and the extent of problem solving skills of grade IV students are still not good. Students prefer to find solutions without having to resort to completion steps. One alternative way that can be done to improve the ability to solve mathematical problems requires a learning model that focuses learning activities on students to play an active role using the Tri N approach (niteni, niroake, nambahake). Tri N is one of the Tamansiswa teachings used by Ki Hadjar Dewantara in the learning process. This study aims to explain the implementation of the Tri N-based problem-based learning model in improving the ability to solve mathematical problems in elementary schools. This type of research is a collaborative classroom action research (PTKK) with the subject of 37 female students. Data collection techniques are carried out by observation, test, and documentation methods. Data analysis techniques use Milles and Huberman analysis techniques consisting of data reduction, data presentation and conclusion drawing (verification). The results of the research that have been conducted show an increase in the problem-solving ability of grade IV students seen from 1) the ability to understand problems from before the action of 10 students (27%) increased to 33 students (89%), 2) the ability to formulate a solution plan from before the action of 7 students (18%) increased to 32 students (86%), 3) the ability to implement the completion plan from before the action of 15 students (40%) increased to 32 students (86%), and 4) the ability to look back at the results obtained from before the action of 2 students (5%) increased to 29 students (78%). Thus, it can be concluded that by implementing the Tri N-

based problem-based learning model, students have problem-solving skills so that they can make provisions for students to be able to understand, choose the right strategy in solving problems that occur in life.

Keywords: problem based learning, problem solving skills, tri n, elementary school.

## **2. Introduction**

One of the functions of mathematics subjects according to Suherman et al (2003: 56) is as a tool to solve problems, both in other subjects, in the world of work, and in everyday life. In solving problems, creative thinking is needed. Creative humans have many ideas in solving problems, one of which is with various personal experiences that they go through to then apply to the problems faced.

The importance of solving mathematical problems is affirmed in NCTM (2000: 52) which states that problem solving is an integral part of mathematics learning. But in fact, the observations of Khasanah, et al. (2016) found that students in Indonesia are still very weak in solving math problems. Math problems for students are sometimes considered not to have a close relationship with everyday life. When given a problem, some students do not understand the problem and have difficulty determining the relationship between quantities / concepts (Respina and Masduki, 2017).

Based on expert opinions, it can be concluded that problem-solving abilities have an important role in learning mathematics, because students gain experience applying knowledge in everyday life and helping students understand the material. With high problem-solving skills, it is expected to affect students' ability to solve problems.

As educators, alternative solutions that can be taken in equipping students with good mathematical problem solving skills, one of which is to build the right learning process. But in fact, according to Mahmudi and Sumarmo (2010), the role and responsibility

of educational institutions at this time are not optimal. . This opinion is supported by the findings of research conducted by McGregor in America, namely two-thirds of Americans aged 16 years to 25 years are not equipped with useful skills to face challenges in life. These abilities include the ability to think creatively and do problem solving (McGregor, 2007). In addition, according to Subandar (2008), there are facts that explain that monotonous learning in the traditional way cannot develop students' thinking skills optimally, there is a view that a good thinking process will lead someone to a deeper understanding in various disciplines, the view that intelligence can be learned, so of course it can also be taught.

Based on the pretest results given by researchers to students, it shows that mastery of roving and broad material is good, but students are unable to solve problems with problem-solving steps, causing students' problem-solving abilities to be low. It is proven that from 37 students, only 3 students or an average of 8.1% have done problem solving and 34 students who or an average of 91.8% have not done using problem solving. According to the grade IV teacher, the itinerant and extensive material from year to year is one of the materials that is classified as difficult in class IV.

To overcome this problem, researchers apply the Problem Based Learning (PBL) learning model through the Tri N approach. In the Content Standards for Primary and Secondary Education Units (BSNP, 2006: 147) it is stated that the focus in mathematics learning is a problem-solving approach. Therefore, the use of the Problem Based Learning (PBL) learning model can be an alternative to improve the ability to solve problems of roving and extensive material in grade IV students.

Problem Based Learning (PBL) is characterized by real problems so that students can learn to think critically and have skills in solving a problem, as well as to gain knowledge (Shoimin, 2016: 130). Thus students are active in learning because students are

preoccupied with real problem-solving activities from students' actual lives. So, by applying the Tri N-based Problem Based Learning (PBL) model, it is hoped that mathematics learning on roving and broad material can increase.

The Tri N-based approach is one of Tamansiswa's teachings that educators do to improve students' mathematical problem solving skills. There are three phases to the Tri N teaching, namely niteni: students observe, pay close attention to the teacher's direction and explanation of the material being studied. Niroake: is the phase of the teacher making sure students have a good understanding of the material presented. If students cannot imitate, the teacher needs to provide guidance or re-explanation so that students are able to properly that the teacher has described. If students are able to imitate well in this phase, the niteni phase is proven to work according to purpose. The final phase of this teaching is addition. This phase is where students are given freedom in determining alternative problem-solving solutions.

Based on the description above, researchers are interested in carrying out Collaborative Classroom Action Research (PTKK) with the title Implementation of Tri N-Based Problem Based Learning Learning Model on Improving Grade IV Elementary School Mathematics Problem Solving Ability.

### **3. Methods**

This study used a type of classroom action research (Classroom Action Research). The subjects in this study were 37 grade 4B elementary school students. The location in this study is in Yogyakarta City. Data collection using observation, tests and documentation. Data analysis techniques use Milles and Huberman analysis techniques consisting of data reduction, data presentation and conclusion drawing (verification). The

collected data is then selected to be reduced, then the data is presented and given conclusions.

The research instruments that need to be prepared are as follows: Observation sheets about teacher and student activities, at the time of the implementation of this study refers to the description of the Problem Based Learning learning model used to obtain data about teacher and student activities during the learning process. The test sheets used in research are in the form of question items carried out after carrying out the learning process needed to obtain data on solving mathematical problems containing questions based on indicators to be achieved so that the quality of solving mathematical problems. Documentation Sheet , this documentation sheet is used to see the completeness of data used in the learning process and research activities in the form of photographs, and learning tools

The data collection techniques to be taken are as follows: Test Problem-solving ability tests are carried out by students doing math problem solving problems that are in accordance with the subject matter, with the aim of knowing how much students master the lesson. The way to collect tests is by collecting the results of students' answers. Observations are made to observe teacher and student activities during learning which applies the problem-based learning model by filling in the columns of teacher activity sheets and student activities using the check list (√) method. Documentation is done by collecting data about photos, and learning tools.

The study was conducted in two cycles. At the action research stage consists of 2 cycles, referring to Arikunto (2002), each cycle goes through 4 stages, namely planning, action, observation, and reflection. This classroom action research is declared successful if the student achievement data to the 4 indicators of problem-solving ability reaches a percentage between 75% - 91% with a classification or category of 'good'. (Mulyasa, 2003).

#### 4. Results and Discussion

Based on the learning outcomes of cycle I and cycle II actions by applying the Tri N-based problem-based learning model, there was an increase in the mathematical problem solving ability of grade IV students on the perimeter and flat area material. Consider the following table:

Tabel 1. Data Peningkatan kemampuan pemecahan masalah matematika

No	Indikator kemampuan pemecahan masalah Matematika	Sebelum tindakan	Siklus I	Siklus II
1	Memahami masalah	10 siswa (27%)	18 siswa (48%)	33 siswa (89%)
2	Menyusun rencana penyelesaian	7 siswa (18,91%)	12 siswa (32,43%)	32 siswa (86,4%)
3	Melaksanakan rencana penyelesaian masalah	15 siswa (40,54%)	23 siswa (62,16%)	32 siswa (86,48%)
4	Melihat kembali hasil yang diperoleh	2 siswa (5,4%)	15 siswa (40,54%)	29 siswa (78,37%)

The improvement of students' mathematical problem solving skills starting from before the action to cycle II is presented in the form of pictures as follows:

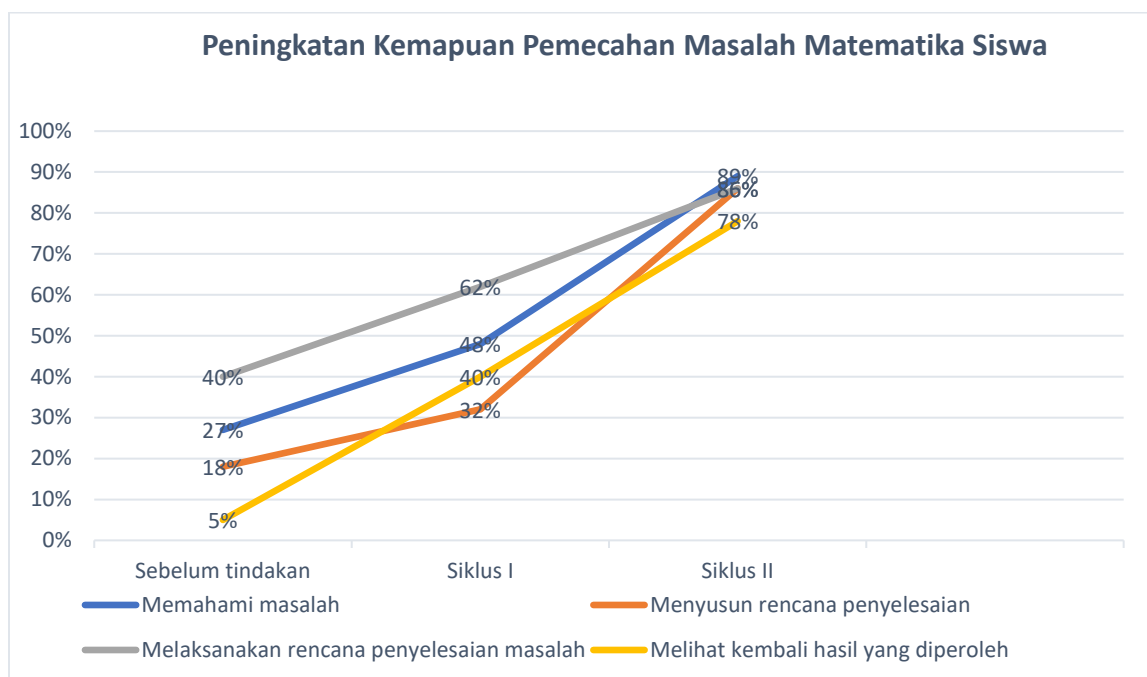


Figure 1. Graph: Improved mathematical problem-solving ability.

The research was carried out in 2 cycles using the problem-based learning model based on the teachings of tamansiswa Tri N. The results of this study showed that using the problem-oriented Problem Based Learning model and required active student involvement in solving it through the syntax of this model.

Trianto (2017) explained the syntax of the PBL model includes: 1) orientation to the problem, at this stage students are given an overview of the purpose of the material to be learned and directed to the problem as a basis for starting learning, 2) organizing students to learn, at this stage learning is arranged in such a way that students can learn with their respective groups, 3) guiding individual or group investigations, at this stage students collect various information relevant to the LKPD provided, 4) presenting the results of work, at this stage students present the results of their respective group work in front of the class and other groups provide responses or additions, 5) Analyze and evaluate problem solving, at this stage students reflect on the investigation and problem-solving

process that has been carried out with the guidance of the teacher, so that students will build understanding of the material being learned.

In the first meeting using the Tri N-based problem-based learning model, students seemed to feel confused. Students feel confused when faced with problems posed in the form of questions then require students to answer with solving steps. The cause of this condition is because students are not experienced in doing problems using indicators of mathematical problem-solving ability. However, at the second meeting students began to be able to digest the problem and formulate alternative solutions to the problem with the guidance of the teacher. From the third to the sixth meeting, students seem to be accustomed to understanding problems, formulating steps to solve them, to arrive at results and conclusions.

## **5. Conclusion**

Based on the results of research that has been conducted with the implementation of the Tri N-based Problem Based Learning learning model on improving the mathematical problem solving ability of grade IV elementary school students, it can be concluded as follows:

1. The results of the research that have been conducted show an increase in the problem-solving ability of grade IV students seen from 1) the ability to understand problems from before the action of 10 students (27%) increased to 33 students (89%), 2) the ability to formulate a solution plan from before the action of 7 students (18%) increased to 32 students (86%), 3) the ability to implement the completion plan from before the action of 15 students (40%) increased to 32 students (86%), and 4) the ability to look back at the results obtained from before the action of 2 students (5%) increased to 29 students (78%).



2. 2. The process of improving the mathematical problem solving ability of grade IV elementary school students with the Problem Based Learning learning model, namely, a) students are directly involved with story problems, then look for known data and data asked, and present problems systematically, b) students find solutions to problems and connect the data asked and choose concepts, formulas, or the strategy to be used, c) students can complete mathematical models including the ability to work and calculate and the ability to develop formulas or strategies chosen, d) students can and are able to interpret solutions, namely re-examining the answers obtained and drawing conclusions on these answers.

Based on the results of the above research, the researchers' suggestions related to this study are as follows:

1. For Teachers

As a reference in carrying out variations of learning, especially in the selection of appropriate learning models and media in accordance with student development and abilities.

2. For the Next Researcher

This research is expected to be a reference for future researchers to develop Tri N-based Problem Based Learning learning models in other elementary schools so as to improve mathematical problem solving skills.

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