

Title : The Effectiveness of Pro-Solve Model to Improve Mathematics Problem Solving Skills Among Primary School Students

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Highlights: Mathematics is a science that has an important role in effort to mastery of science, technology and also in everyday life. Based from interview with teachers and literature reviews, it was found that most students lack of mathematical problem solving skills. It is caused by students' inability to understand keywords and interpret the problems in mathematical sentences. Inability to figure out what to assume and what information from the problem hinder the students to answer the questions. Pro-Solve Model is design based on four-steps process of problem solving developed by George Polya (1985). In order to investigate the effectiveness of the Pro-Solve Model, a test was carried out among standard 3 students in Primary School, Johor Bharu. The Pro-Solve Model has been used by the teacher who teaches mathematics. The line graph shows a significant increment in the students' test scores. Hence, this model is proven effective in teaching the respective topics while engaging the students with the lesson.

Key words: problem solving; keywords; mathematics equation; calculation

Introduction

Mathematics plays a very important role in our daily living. It is a subject that deals with problems which involve a process of analysis, computation and other mental skills. Its goal is the involvement of the students in the process of discovering mathematical ideas and formulating process.

Based on our findings from interview with teachers and observation from the real situation in school, it was found that most students lack of mathematical problem solving skills. This is one of the reasons of low achievement in mathematics subject. It also reflects that students have difficulties in understanding mathematical problems affecting the process of problem solving. When students can understand and have the skill to solve arithmetic questions, they can feel more confidence in their mathematic skills which in return will improve their mathematics skills.

Content

1. Product Description

Pro Solve Model equipped with list of common mathematical words which has been group into different mathematics operation which are plus, minus, multiply and divide. It is equipped with a set of problem solving questions which students need to identify the keywords and they can used the list to help and guide them in identifying which mathematics equations to be used to solve the problems.

Taking consideration for students with different level of learning, some of students still need to calculate using some sort of calculation aids such as ice cream sticks or even their using their fingers. Adding to that, students must know and differentiate place value in number which are *sa, puluh, ratus dan ribu* (ones, tens, hundreds and thousands) . Some of the students still have difficulties in identifying these digits. As a solution, Pro Solve Model included with a set of buttons to guide them in using the place value to solve the problems. It is expected to enhance their understanding and at the same time is interactive enough for them to be interested in learning.

Based from all interviews, researches and observations from real situation into consideration, we decided to make **Model Pro-Solve** as a teaching aids product for students which in return can help teachers to create a better and fun way to exposed students to problem solving questions in mathematics. Students have difficulties understand and changing sentences into mathematical language. Below are the features of **Pro-Solve Model** that will help to solve the problem.

Problem	Features that help to solve problems
Difficulties understand and changing sentences into mathematical language	Keyword
Calculate using calculation aids	Button badge
Difficulties in identifying digits	

2. Benefit

- i. Students are engage in learning when they are using the model.
- ii. Students are able to comprehend the problem solving questions using the technique taught.
- iii. Students are able to differentiate the usage of keywords and apply them in the questions.
- iv. Cater the students' needs through LOTS and HOTS questions.
- v. To create positive emotional classroom environment.

3. Methodology

- i. Prepare two sets of questions. (Pre-test and Post-test)
- ii. Create a kit based on mathematics problems affecting students to process the problem solving.
- iii. Using the four-step process in problem solving. (Understand the problem, Device a plan, Carry out the plan, Look Back)
- iv. Model Pro-Solve has been tested on standard 3 students.
- v. Model Pro-Solve use as teaching tool to help students in mathematics problems solving.

4. Product

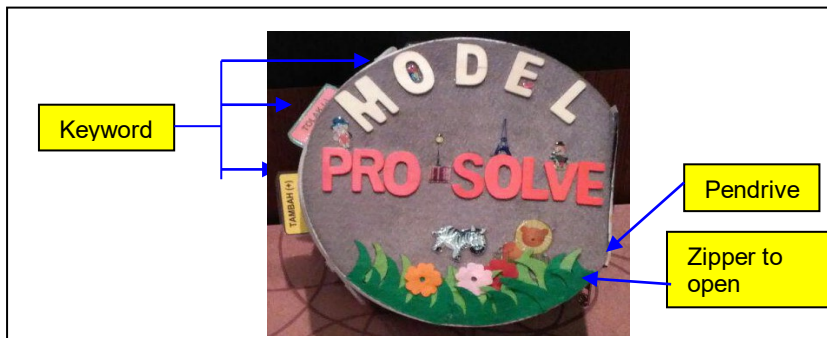


Figure 1: Front view of product

5. Commercialization Potential

After this product had been tested for the pre-test and post-test, it was found that it was very effective in helping students understand concept of problem solving questions. The students is engage in learning when they are using the model. It showed that students was enjoying their time learning the subject that they found as difficult to understand. By referring to these reasons, it shows that this product is highly suitable to be used as teaching aids in mathematics topic.

Some of the difficulties face by school after buying a product is that some students get bored with the same set of questions. While using this product, teacher can create their own set of questions as components of this product can be used on its own. For example, teacher can used only kits to teach student about place value without using the questions. Moreover the price is affordable enough with the cost price of RM73.40 to be bought by the schools

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