

POLYA MODEL THROUGH MATHEMATICS ROBOT MEDIA (ROMI) FOR STORY SOLVING IN CLASS 1 STUDENTS OF SD JUARA SURABAYA

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Abstract :

This research was motivated by the low ability of students to solve word problems in grade 1 SD Champion Surabaya. Students experienced difficulties in this study due to the low ability of students to solve word problems in class I SD Champion Surabaya. Students experience difficulties in solving addition and subtraction story material questions. The aims of this study were: 1) To find out the application of the Polya model in improving story problem solving abilities in learning Mathematics with the Polya model through the Mathematical Robot (ROMI) medium for first grade students at SD Champion Surabaya. 2) To find out the activities of teachers and students in improving the ability to solve story problems in learning Mathematics with the Polya model through the Mathematical Robot (ROMI) media in class I SD Champion Surabaya. This classroom action research uses the Kurt Lewin model which is carried out in 2 cycles. Each cycle consists of 4 stages, namely planning, action, observation, and reflection. The subjects of this study were 21 students in class I SD Champion Surabaya. The action taken is implementing the Polya model . Data collection techniques in the form of observation, questionnaires , tests and documentation. The results showed that: 1) The ability to solve story problems for first grade students at SD Champion Surabaya after using the Polya model with ROMI media in learning mathematics experienced a very significant increase. The ability to solve students' story problems increases in each cycle. In pre-cycle activities, 23.80% of students completed and 76.2% did not complete. In cycle I, 47.6% of students completed and 52.3% did not complete. Whereas in cycle II as many as 85.2% of students who completed and 14.8% of students who did not complete. 2) The average score of student worksheets on stories from class I SD Champion Surabaya students after using the Polya model with ROMI media in learning mathematics had a good improvement. In the pre-cycle activities, the average score for the LKS story questions for class I students was 74. The average score for the work on the LKS story questions for class I students in cycle I was 80. Meanwhile, the average LKS score for story questions for class I students was 93 at cycle II. 3) The application of the Polya model using ROMI media in improving the ability to solve story problems for first grade students of SD Champion Surabaya in learning Mathematics has been successful.

Keywords : story solving , robots , media

INTRODUCTION

Mathematics is a scientific discipline that studies the concepts, structures and relationships in the fields of numbers, space and shapes. Mathematics involves solving problems using logic and different mathematical methods, such as algebra, geometry, analysis and statistics. Mathematics is also used in various fields, such as science, technology, economics, business, and others. As a scientific discipline, mathematics contributes to our understanding of the universe and provides important tools and techniques for solving complex problems.

Problem solving is very useful in life, so mathematics content is taught at the school level from an early age to hone logical thinking as a provision for future life in society. Every student must be able to find solutions to problems both in everyday life and learning mathematics even though it is considered difficult. Therefore, mathematics is usually considered the most difficult, scary, and less interesting subject. There are several reasons why mathematics is considered difficult for some students, namely lack of basic skills, lack of motivation, lack of practice, lack of understanding of concepts, and fear and anxiety.

Students who do not understand these basic skills and concepts may experience difficulties in understanding further mathematical material. Exercise and repetition need to be given so that students can understand the material better. Students who do not have sufficient practice in solving mathematical problems may find it difficult when faced with more complex problems.

Difficulties in understanding these concepts may be experienced by students because they have difficulty understanding more complex material. Sometimes, teachers also fail to provide clear and structured explanations.

Yuwono et al. (2018) stated that word problems were subjects that were difficult for students to master. Therefore certain strategies are needed to be able to solve problems in mathematics, especially word problems. This causes students to take longer to understand the text of difficult questions. Students must first pay attention and visualize information to help remember and understand what they have read.

In addition, some students may feel afraid or anxious about mathematics because they believe they do not have the ability to understand the material. This fear can affect their self-confidence and make them feel difficult when studying or doing math problems.

Story problem material for grade 1 elementary school usually contains simple stories that contain moral messages, solving everyday life problems, or lessons that are useful for children in everyday life. Ariani (2018) states that solving word problems is not just answering the questions given, but more importantly students are able to understand how to solve problems from various story questions. Often students find it difficult to solve questions in the form of word problems. Students do not understand the meaning of words or terms that appear in word problems, so students are confused about what is known and what is asked from the questions given.

This situation was also found in first grade mathematics learning at SD Champion Surabaya. Students still perceive mathematics as a difficult and unattractive subject. Based on the results of observations made by researchers to class I SD Champion Surabaya students, there are several factors that cause mathematics to be considered a difficult subject for students, including first, the teacher teaches mathematics only with the lecture method, not yet using varied teaching. so

that students are less independent in the learning process and learning outcomes are unsatisfactory.

Based on the results of the questionnaire , there were still students who had difficulty learning mathematics. Some students also feel bored when learning math concepts, especially when working on math word problems.

There are still those who have difficulty distinguishing the concepts of addition and subtraction in solving word problems.

In addition to students having to be able to master mathematical concepts, the ability to solve math word problems is also one of the mathematical abilities that every student must have. This is because word problems are useful for students to know the subject matter being studied and improve students' ability to make decisions . In solving word problems, it is not just about answering the questions given, but more importantly students are able to understand how to solve the problem from story problems.

The concept of learning mathematics word problems addition and subtraction involves understanding basic mathematical concepts such as addition and subtraction and the ability to apply them in everyday life situations through learning through the stories or problems given.

Based on initial data on daily test scores related to word problems related to addition and subtraction in class I SD Champion Surabaya, there are still quite a number of students who have difficulty solving word problems in the form of addition and subtraction. Students do not understand the terms that appear in word problems, so students are confused about what is known and what is asked from the questions given. As for the 21 students, only 23.8% (5 students) whose scores met the minimum completeness criteria (KKM), namely 80, while the other 76.2% (15 students) still did not meet the KKM. From these data it can be seen that the ability to solve math story problems for class I SD Champion Surabaya students is still low.

According to Musdiani in Alpadery , et al. (2020) that a teacher who is directly actively involved in the learning process plays an important role in determining student learning outcomes. The teacher must be able to determine the appropriate learning model according to the material and learning objectives. Selection of appropriate learning methods in teaching and learning activities can determine the achievement of understanding of the material delivered by the teacher.

The various problems above require appropriate solutions and handling so that learning can take place properly. This is where teachers are required to be creative in creating learning. Appropriate and interesting learning media/strategies/models/methods are needed to achieve learning objectives quickly and pleasantly. In this problem, one of the steps that can be taken is to use the Polya learning model . According to Mustika & Riastini , the Polya learning model is one of the learning models that is the core of learning about problem solving. There are 4 stages of the Polya learning model , namely: understanding the problem, developing a problem-solving plan, implementing the plan that has been prepared and re-examining the answers that have been obtained.

The research results presented by Zakiyah , et al. (2019) shows that the learning design with a contextual approach to the problem-based learning model based on Polya's steps can be used as a learning innovation that is in accordance with the demands of the current curriculum as follows. (1) student orientation towards the problem; (2) implementation of learning activities; (3) fostering independent and group investment based on Polya's problem solving steps ,

including: (a) understanding of the problem; (b) preparation of plans; (c) implementation of the plan; and (d) re-examination; (4) implementation of the development and presentation of works; and (5) implementation of the analysis and evaluation of the problem solving process.

Muhsetyo (12:2023) stated that there was an effort to solve George Polya's problem which was a realization of the desire to improve mathematics learning. Therefore, students have broad and deep views or insights when facing a problem. Problems are questions to train the mind through inquiry, discussion, and critical reasoning. A student is able to solve a story problem if the student understands the structure and meaning of the activities used to choose the right and appropriate algorithm or procedure.

Based on previous research conducted by Susana Sole (2019) concluded that the use of the Polya model in the form of addition and subtraction story problems can improve student achievement in class III SD Inpres Warikeo , East Nusa Tenggara.

Another study conducted by Vina Nur Afianah (2020) found that the use of the polya model in the form of story questions on area and flat circumference material in grade IV students was able to improve learning outcomes at MI Hidayatus. Shibyan , Gresik.

Based on the above problems and previous supporting research, the authors seek to overcome these problems by conducting research entitled "Improving the Ability to Solve Story Problems in Mathematics Learning with the Polya Model Through Mathematical Robot Media (ROMI) in Grade I Students at SD Champion Surabaya".

Problem Formulation The Classroom Action Research (CAR) problem formulation of the problem is as follows

Polya model with Mathematical Robot (ROMI) media improve the ability to solve story problems in Mathematics learning for 1st graders at SD Champion Surabaya?

Polya model with Mathematical Robot (ROMI) media for grade 1 SD Champion Surabaya?

C. Learning Improvement Research Objectives

In accordance with the formulation of the problem, the objectives of this study are as follows.

the Polya with Mathematical Robots (ROMI) model in improving the ability to solve story problems in Mathematics learning for class 1 SD Champion Surabaya.

Polya model with Mathematical Robot (ROMI) media for class 1 SD Champion Surabaya.

D. Benefits of Learning Enhancement Research

Based on the research objectives, this research is expected to provide the following benefits:

1. Theoretical

Theoretically, this research can be an alternative source for further research writing. This research can provide an overview of the importance of using learning models that are able to please students, one of which is through the application of the Polya model to improve story problem-solving skills in learning mathematics on the subject of addition and subtraction of 1st grade students at SD Champion Surabaya.

2. Practical

A. For Teachers

It is hoped that this research can be a reference for applying interesting learning methods to grade 1 mathematics at SD Champion Surabaya, so that learning becomes a fun activity.

B. For Students

Students can experience fun learning through the Polya model , so that students understand addition and subtraction material more quickly in word problems.

C. For School

As a form of useful contribution in improving and enhancing the quality of learning in the classroom.

D. For Community

The community is increasingly trusting and actively supporting the improvement of the quality of education units to be even better.

e. For researchers

Researchers can gain experience and knowledge about the application of the Polya model and the implementation of the theories that have been obtained.

METHOD

The research subjects were teachers and grade 1 students at SD Champion Surabaya for the academic year 2022/2023, totaling 21 children, with 11 male students and 10 female students. Selection of class I as and determination of research subjects to be subjected to corrective action learning is based on problems that occur in class I. The problems faced by class I students based on the author's observations and analysis are students have the ability to solve math story problems for class I SD Champion Surabaya still low. As for the 21 students, only 23.8% (5 students) whose scores met the minimum completeness criteria (KKM), namely 80, while the other 76.2% (15 students) still did not meet the KKM.

Grade 1 SD students are usually between 6-7 years old and are entering a transition period from the pre-school stage to the world of formal schooling. Here are some general characteristics of grade 1 elementary school students as follows.

a) Having short attention: Grade 1 SD students tend to have short attention and find it difficult to concentrate for a long time. Therefore, learning must be done in an interactive, interesting and challenging way so that students remain interested and focused.

b) Happy to play: Grade 1 SD students like to play and learn while playing. Therefore, learning should involve fun games or activities to increase student interest and motivation.

c) Tendency to be active: 1st grade students have a need to move and be active. Therefore, learning must be done by combining physical movements and challenging activities so that students remain active and engaged.

d) Have great curiosity: Grade 1 Elementary students have a great curiosity about the world around them. Therefore, learning must be carried out by bringing interesting and relevant topics to students' daily lives.

e) Learning through direct experience: Grade 1 SD students learn through direct experience and through interaction with their environment. Therefore, learning should be done by integrating field activities or activities outside the classroom to provide direct experience to students.

RESULTS AND DISCUSSION

A. Discussion of Research Results

A. Ability Results Finish Question Story in Learning Mathematics in Pre-Cycle

Repair learning with application of the Polya model done after researcher get results from the previous learning process (pre-cycle) that uses sheet Work student .

Table 4.1

Results LK Question Story Pre-Cycle

NO	NAME	MARK	INFORMATION
1	AZU	70	Not yet complete
2	AFI	70	Not yet complete
3	AAQ	70	Not yet complete
4	AHM	70	Not yet complete
5	AFA	90	complete
6	AND	70	Not yet complete
7	ARY	90	complete
8	CAN	70	Not yet complete
9	ELZ	70	Not yet complete
10	FAZ	90	complete
11	FAT	70	Not yet complete
12	IS	70	Not yet complete
13	MAZ	70	Not yet complete
14	MLU	70	Not yet complete
15	MTA	95	complete
16	NBL	90	complete
17	NRD	50	Not yet complete
18	KAY	60	Not yet complete
19	NDR	70	Not yet complete
20	syi	70	Not yet complete
21	VIN	70	Not yet complete

From the results mark sheet Work students on activities Pre-cycle is 23.8%. it _ signify that learning the not enough succeed that is is in the range rating 1-25%. Average grades on sheet Work student is 74 with KKM 80.

Ability Results Finish Question Story in Learning Mathematics Through the Polya Model Repair learning with application of the Polya model done after researcher get results from the learning process before (Cycle I) using sheet Work student .

following This presented in table 4.2 results processing sheet Work settlement question story in cycle I.

Table 4.2

Results LK Question Story Cycle I

POLYA MODEL THROUGH MATHEMATICS ROBOT MEDIA (ROMI) FOR STORY SOLVING
IN CLASS 1 STUDENTS OF SD JUARA SURABAYA

NO	NAME	MAR K	INFORMATIO N
1	AZU	70	Not yet complete
2	AFI	70	Not yet complete
3	AAQ	100	complete
4	AHM	70	Not yet complete
5	AFA	80	complete
6	AND	90	complete
7	ARY	80	complete
8	CAN	100	complete
9	ELZ	100	complete
10	FAZ	70	Not yet complete
11	FAT	70	Not yet complete
12	IS	70	Not yet complete
13	MAZ	70	Not Completed
14	MLU	70	Not Completed
15	MTA	70	Not Completed
16	NBL	90	complete
17	NRD	100	complete
18	KAY	90	complete
19	NDR	70	Not Completed
20	syi	70	Not Completed
21	VIN	70	Not Completed

From the results mark sheet Work students on activities Cycle I was 47.6%. it _ signify that learning the Enough succeed that is is in the range rating 26-50%. Average grades on sheet Work student is 80 with KKM 80.

C. Ability Results Finish Question Story in Learning Mathematics Through the Polya Model

Repair learning with application of the Polya model done after researcher get results from the previous learning process (Cycle II) using sheet Work student .

following This presented in table 4.3 results processing sheet Work settlement question story in cycle II.

Table 4.3

Results LK Question Story Cycle II

NO	NAME	MAR K	INFORMATIO N
1	AZU	70	Not yet complete
2	AFI	100	complete
3	AAQ	100	complete

4	AHM	90	complete
5	AFA	90	complete
6	AND	100	complete
7	ARY	100	complete
8	CAN	100	complete
9	ELZ	100	complete
10	FAZ	70	complete
11	FAT	90	complete
12	IS	100	complete
13	MAZ	100	complete
14	MLU	70	Not yet complete
15	MTA	100	complete
16	NBL	100	complete
17	NRD	100	complete
18	KAY	90	complete
19	NDR	100	complete
20	syi	100	complete
21	VIN	80	complete

From the results mark sheet Work students on activities Cycle II is 90.4% of students who complete . it _ signify that learning it was very successful that is is in the range rating 76-100%. Average grades on sheet Work student is 89 with KKM 80.

Success enhancement ability finish question story learning Mathematics through the Polya model with Mathematical Robot media reach through study This can Look solidtable following this .

Table 4.4 Enhancement Ability Student

N O	Completeness	Pre Cycle		Cycle I		Cycle II	
		Amount	%	Amount	%	Amount	%
1	complete	5	23.8%	10	47.6%	18	85.2%
2	Not yet complete	16	76.2%	11	52.3%	3	14.8%

Enhancement the can visible in shape chart enhancement ability finish problem question story in learning Mathematics in bar chart shape following this .

POLYA MODEL THROUGH MATHEMATICS ROBOT MEDIA (ROMI) FOR STORY SOLVING
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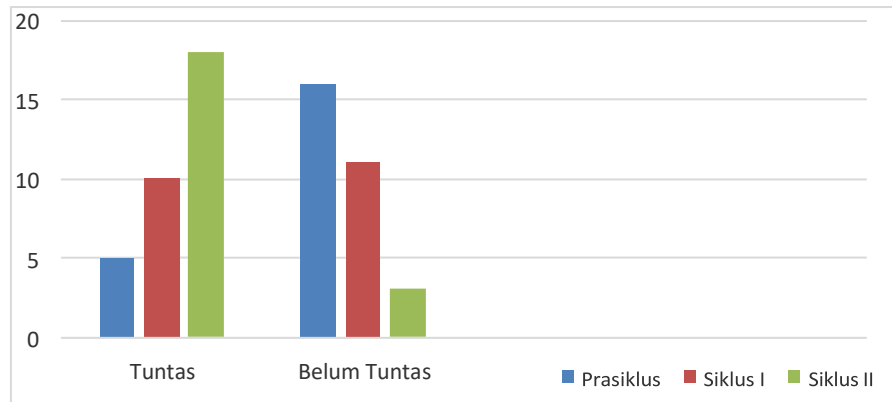


Diagram 4.1

Enhancement Ability Finish Question Story

Increase in average ability finish question stories on learning Achieved mathematics _ student class I SD Champion Surabaya Surabaya after repair learning with apply the Polya model using Indonesian Robot media (ROMI) in cycles I and II possible improvement _ seen in tables and graphs following .

Table 4.5

Enhancement Average Value Results Sheet Work Student

NO	Information	Pre Cycle	Cycle I	Cycle II
1	The average workmanship of the sheetstudent work	74	80	93

Enhancement the can visible in shape chart enhancement mark sheet ability finish problem question story in learning Mathematics in bar chart shape following this .



Diagram 4.2

Diagram Value Increase Sheet Work Student

After Certain repair learning in cycles I and II was obtained Very significant results , researchers feel activity repair ability finish question story in learning Mathematics with the Polya model done already very successful and students understand material question story with ok .

Utilization of learning models Polya for student in study This is capable increase ability student among other things, can be facilitated student understand what to _ searching for For finish problem , understand stages in finish problem in a manner specific , as well make it easy student compile framework think For finish problem .

While necessary _ attention to implementation Polya's learning model in research This is application study This student need time long and necessary understanding more For can finish question story Mathematics .

Researcher feel that method Polya This capable meet the indicators ability finish question story . Method Polya felt capable fulfil criteria and fit with objective For increase ability finish question story learning Mathematics material addition and withdrawal in class I SD Champion Surabaya. As for indicators that can used is as following .

- a) Pupils capable understand problem with write what is known and what is asked from question .
- b) Pupil capable make planning with create a strategy for finish question story .
- c) Pupil capable carry out plan with do question in accordance with the way it has been determined .
- d) Student capable evaluate results with check return all decisions involved and answered _ question in accordance context problem question story inside _ group .

CONCLUSION

Based on description in the discussion above about repair learning done _ for 2 cycles on learning mathematics material question story , author can take conclusion as following . Ability finish question story student class I SD Champion Surabaya after using the Polya model with ROMI media on learning mathematics experience very significant increase . ability finish question story student increases on each the cycle . On activities pre-cycle as many as 23.80% of students who have completed and 76.2% of students who have not complete . In cycle I as many as 47.6% of students who completed and 52.3% of students who had not complete . While in cycle II as many as 85.2% of students who completed and 14.8% of students who had not complete . Average value results processing sheet Work student question story student class I SD Champion Surabaya after using the Polya model with ROMI media on learning mathematics experience good improvement . _ On activity pre-cycle , average values results processing sheet Work student question story student class I is 74. The average value results processing sheet Work student question story student class I in cycle I was 80. While the average value results processing sheet Work student question story student class I was 93 in cycle II. Application of the Polya model with using internal ROMI media increase ability finish question story student class I SD Champion Surabaya in learning Mathematics Already done researcher very successfully . _ Most _ student class 1 already capable apply indicators that exist in the Polya model in increase ability finish question story student class I SD Champion Surabaya.

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