Volume 1 Nomor 3 (2023)
ISSN : 2986-7665 (Media Online)
Edition September 2023

Application of the *Means Ends Analyswas Learning Model* to Improve Student Learning Outcomes in Mathematics Subjects in Class V UPT SDN 3 Amparita

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Abstract

Matematics ability was necessary for now, but the learning process in which it was carried out was not yet directed, so that it affected the student's learning result. Because it was necessary to apply a learning model that was able to overcome this. The aim of this study *was* to improve the process and results of student learning of mathematics in Class V of UPT SDN 3 Amparita. The research method used was qualitative research with class action research (CAR). The Data collection techniques used were observation, tests, and documentation. The subjects of this study were teachers and students of class V for the 2022–2023 academic year, which consisted of 23 students. The procedure for applying the action consists of planning, implementing, observing, and reflecting. The results of the research obtained were that the first cycle had less qualification, the second cycle had sufficient qualification, and the third cycle had good qualification. So it could be concluded that the application of *the Means Ends Analysis* learning model can improve the processes and results of student learning of Mathematics in class V of UPT SDN 3 Amparita.

Keywords: Means Ends Analysis; Learning Result

Introduction

The development of science and technology in the globalization era was very rapid, and the competition for Human Resources was more intense, whose influence has penetrated the education world. The efforts to improve Human Resources are currently being carried out by the government in order to deal with developments in science and technology, one of which is improving the quality of education. Education functions to improve abilities and form a dignified character and nation; it aims to develop the potential of students to become human beings with good character and have the knowledge and skills to develop their human resources. In the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, Chapter 1, Article 1, it was stated that:

Education was a conscious and planned effort to create a learning atmosphere and learning process in which students actively developed their potential to have religious spiritual strength, self-control, personality, intelligence, good character, and the skills needed by themselves, society, the nation, and the country. Education was a place for every student to acquire the knowledge, skills, and values they needed to achieve quality of life and be well. The best education should meet predetermined standards. In order to improve the quality of education, the learning process must be in accordance with the standards of the educational process.

Republic of Indonesia Government Regulation Number 32 of 2013 Concerning National Education Standards Article 19 Paragraph 1 explains that: The learning process in educational units was organized interactively, inspiring, fun, and challenging,

motivating students to actively participate, and providing sufficient space for initiative, creativity, and independence in accordance with the talents, interests, and physical and psychological development of students. Based on the regulations, it could be seen that education must give motivation to students to actively participate in the learning process and provide sufficient space for students to channel their abilities and knowledge. The efforts to achieve good educational standards require education and teaching in various disciplines. One of the disciplines was mathematics. Mathematics was one of the subjects to become basic knowledge for the others because there was to be the ability to count, use logic, and think. This was in line with the theory put forward by Susanto (2015) that mathematics is a scientific discipline that has an important role in improving thinking and argumentation skills. In addition, mathematics is also widely used in problem solving in everyday life and supports the development of science and technology.

The efforts made to increase the quality of learning results in mathematics were continuously being developed, such as improving the curriculum, increasing the ability of teachers, and providing textbooks. However, the reality on the ground shows that the understanding of mathematics in general was not in accordance with what was expected.

Learning activities would be directed if they had clear guidelines; the learning model was one way that could be applied. The application of the *Means Ends Analyswas* model was expected to be able to encourage students to be involved in problem-solving analyses and work together in groups. *Means-Ends Analysis*, according to Huda (2018), was a strategy that separated the known problems *(problem states)* and the goals to be achieved *(goal states)*, which were then followed by various means to reduce the differences that existed between problems and goals. So in learning, students were involved in analyzing problems and finding solutions to them.

The Means Ends Analysis (MEA) learning model was a variation of problem-solving learning. In problem solving, students would be given a problem in learning and then look for a solution to solve it with critical thinking activities with their group. MEA focuses on the difference between the "initial state" and the"destination state" is a problem. The initial state was the current situation where the problem occurs, while the goal state was the desired state to be achieved through a series of actions.

MEA is a system thinking method that, in its application, plans overall goals. At the beginning of learning determined in advance clear objectives to be achieved. The learning objectives were made into several objectives, which in the end became steps or actions based on the applicable concepts. At the end of each goal, it will end in a more general goal. In the learning process carried out, students would elaborate problems into simple problems so that it was easier to achieve the goals set previously. In the results of research on *Means Ends Analyswas* conducted by Mulasari et al. (2022), it could be seen that learning that applies the *Means Ends Analyswas model* could improve students' mathematics learning results in class V SD Negeri Gugus Ki Hajar Dewantara South Denpasar. Meanwhile, the results of Wahyono's research (2017) found that applying the *Means Ends Analysis learning model* could improve student learning results about comparisons. The pre-cycle showed that only 16.67% transcended the Minimum achievement criteria; in cycle I, this increased to 66.67%, and in cycle II, students who transcended the Minimum achievement criteria reached 100%.

Herawanti and Mintohari (2017) also found that the application of the *Means Ends Analysis learning model* improved the learning outcomes of fourth grade students at SDN Kebraon 1 Surabaya. Whereas the research results of Harto, Agung, and Wibawa (2014) found that the *Means Ends Analysis learning model* had an effect on improving learning results for fourth grade students in the odd semester of the 2013/2014 academic year at SD Desa Bebetin.

Methods

This research would be carried out in class V UPT SDN 3 Amparita using qualitative research methods that were descriptive in nature to describe things that were the focus of research to gain a deep understanding of a phenomenon. This type of research was classroom action research (CAR) to improve the quality of teaching and learning in the classroom. In this classroom action research, the researcher applied the *Means Ends Analysis learning model* to the learning process about speed, distance, and time. There were two things that were the focus of the research, namely: 1) focus on process, namely to pay attention to how the activities of teachers and students in class were in the process of learning mathematics through the application of *the Means Ends Analyswas* learning model; and 2) Focus on results, namely to know how student learning results in class V UPT SDN 3 Amparita in mathematics after applying the *Means Ends Analyswas learning model*. The subjects in this classroom action research were teachers and students of class V UPT SDN 3 Amparita, with a total of 23 students consisting of 15 men and 8 women who were active and enrolled in the odd semester of 2022/2023. The Action research consisted of pre-action, action planning, action implementation, observation, and evaluation, as well as regular reflection from one action to the next. The data collection techniques used were observation, tests, and documentation studies. The data that has been obtained from further research was analyzed using qualitative analysis based on two criteria, namely process indicators and outcome indicators.

Result and Discussions

Pre-research activities were carried out immediately on Saturday, August 29, 2022, by visiting UPT SDN 3 Amparita. The purpose of this visit was to coordinate with the school principal so that researchers could be given permission to conduct research. After obtaining permission from the school principal, the researcher then coordinated with the class V teacher at UPT SDN 3 Amparita to discuss plans and research schedules to be carried out. Then the researchers collected initial data on students' mathematics learning outcomes. The data was in the form of students' daily mathematics test scores obtained from the class V teacher. The researcher also made observations of the learning process so that information could be obtained that the process and student learning outcomes were low. The research results were obtained through classroom action research in class V UPT SDN 3 Amparita, which was carried out in 3 cycles to examine the improvement of student learning processes and outcomes in mathematics subjects about speed, distance, and time by applying the Means Ends Analysis learning model. This research was conducted in three cycles, with every cycle consisting of four stages: planning, implementing, observing, and reflecting. The implementation of cycle I actions was carried out on Wednesday, September 2, 2022, and Thursday, September 3, 2022; cycle II was carried out on Wednesday, September 9, and Thursday, September 10, 2022; and cycle III was carried out on Wednesday, September 16, 2022, and Thursday, September 17, 2022. Learning was carried out twice in one cycle because students were divided into two study groups, namely 50% to comply with health protocols during the *COVID-19 pandemic*, with details of 11 students entering on Wednesday, 08:00–9:45 a.m. (group I), then 12 students on Thursday, 08:00–9:45 a.m. (group II) with the same study.

1. Cycle I

a. Planning

The planning was done by applying the *Means Ends Analysis* learning model to improve student learning outcomes about speed, distance, and time. The researcher also consulted with the homeroom teacher to ensure the smooth running of the learning

process. In cycle I, 11 students entered the classroom for group I and 12 students for group II. The next activity was to prepare the things needed during the implementation of cycle I actions. The things prepared were as follows:

1) Develop a learning implementation plan with the subject of knowing speed, distance, and time by applying the *Means Ends Analysis learning model*.
2) There were learning materials and resources.
3) Make observation sheets to observe student and teacher activities during the learning process.
4) Develop group worksheets according to the learning indicators to be achieved.
5) Answer keys and scoring guidelines are given in the cycle.

b. Implementation of the actions

The implementation of the actions in Cycle I was carried out on Wednesday, September 2, 2022, starting at 08.00–09.45 a.m. for the first group and Thursday, September 3, 2022, starting at 08.00–09.45 a.m. for the second group. In carrying out this research cycle, the teacher who acted as the teacher was the researcher, while the teacher who acted as an observer was the teacher of class V UPT SDN 3 Amparita. Implementation of learning in cycle I was attended by all fifth grade students of UPT SDN 3 Amparita, as many as 23 people, with details of 11 students in the first study group and 12 students in the second study group.

The implementation of learning starts with the initial activity, namely when the teacher greets and asks the class leader to lead his friends to pray. Then, before starting the lesson, the teacher invites students to sing the national anthem together. Next, check student attendance. After that, the teacher held an audience by relating the past material to the material to be learned.

1) Furthermore, the activities carried out were a series of core activities in the Learning Implementation Plan. At the core stage, the teacher applies the steps of the *Means Ends Analysis learning model*, namely as follows: The teacher conveys the learning objectives to be achieved.
2) Motivate students to engage in selected problem-solving activities. Teachers provide motivation for students to be actively involved in learning and solving problems. The teacher explains material about speed, distance, and time in unit conversion.
3) Students were assigned to define and organize learning tasks related to these problems. The teacher discusses examples of questions and, together with the students, defines the problem. How to define the problem, namely setting goals and formulating ways that must be done to solve the problem.
4) Students were grouped into 5 or 6 groups (the groups formed must be heterogeneous) and given assignments or problem-solving questions for each group. The teacher divides students into heterogeneous groups and gives them worksheets containing problem-solving questions.
5) Students were guided to identify problems, collect data, and draw conclusions. The teacher guides students to identify problems and then find the conditions needed to solve problems before connecting and drawing conclusions as answers to problems.
6) Students were asked to reflect on or evaluate their investigations and the processes they use. The teacher guides students to present their work and then reflects on the method they used to solve the problem.
7) Students were guided to conclude the material that had been studied.

In the closing activity, the activities carried out were: the teacher gave an evaluation; after that, the teacher gave moral messages; and the teacher asked the class leader to lead a prayer to end the lesson.

c. Observation

The things that were observed in the implementation of Cycle I were the implementation of the *Means Ends Analysis learning model*, teacher activities, and student activities in learning activities. Based on the results of observations of the implementation of cycle I actions, it can be explained that learning has not reached maximum results even though it has experienced an increase. From the whole series of learning, there were some findings from the observer (the class teacher). The findings regarding teacher (researcher) activities carried out in Cycle I were as follows:

In the step of explaining the learning objectives. The teacher carries out one indicator with good qualifications, namely writing learning objectives on the blackboard. 1 indicator was categorized as sufficient, namely reading the learning objectives in full, and lacking, namely explaining the learning objectives.

1) In the step to motivate students to be actively involved in problem solving activities, the teacher implements two indicators with fewer categories, namely motivating students to be active during learning and motivating students to be involved in problem solving. While the indicators explaining the material with a heuristic approach were categorized as sufficient,
2) In the step to help students define and organize learning tasks related to teacher problems, carry out indicators explaining how to complete problem solving tasks in a good category. Indicators help students define tasks related to problem solving that are categorized as sufficient, and indicators help students organize tasks related to problem solving that are still categorized as lacking.
3) In the step of forming groups and giving assignments or problem-solving questions to each group, the teacher has carried out three indicators in the good category. Form 4-6 heterogeneous groups, give assignments or problem-solving questions to each group, and explain the worksheets that students will do.
4) In the step of guiding students to identify problems, collect data, and draw conclusions, the teacher implements three indicators in the sufficient category. The indicators that were implemented were guiding students to identify problems, finding problem-solving requirements, and analyzing the methods needed to solve problems.
5) In the step of helping students reflect on or evaluate their investigations and the processes they use, the teacher implements 1 indicator in the sufficient category, namely guiding students to present problem-solving tasks that have been solved, and 2 indicators in the less category, namely guiding students to reflect on problem-solving activities that have been carried out and evaluate the processes they use.
6) In the step of guiding students to conclude the material that has been studied, the teacher implements three indicators in the sufficient category, namely giving students the opportunity to ask questions, having them conclude the subject matter together with the teacher, and providing a moral message.

Based on the results of the observer's observations of the teacher during the first cycle of learning, the total score obtained was 41 out of 69, which was sufficient qualification but not yet an indicator of success. The results of observations of student activities while participating in learning were:

1) The stage of paying attention to the teacher explaining the learning objectives and noting them was categorized as sufficient because 4 students got the good category, 15 students got the sufficient category, and 4 students got the less category.
2) The stage of adding to the teacher's motivation to be actively involved in problem-solving activities was categorized as sufficient because 4 students were in the good category, 16 students were in the sufficient category, and 3 students were in the less category.

3) The stage of defining and organizing learning tasks related to the given problem was categorized as lacking because 12 students were in the sufficient category and 11 students were in the less category.
4) The stage of forming groups and working together to complete tasks was categorized as sufficient because 7 students were in the good category, 10 students were in the sufficient category, and 6 students were in the poor category.
5) The stages of identifying problems, collecting data, and drawing conclusions were categorized as lacking. 3 students are in the good category, 8 students are in the sufficient category, and 12 students are in the poor category.
6) The stage of reflecting and evaluating their investigations and the processes they use was in the less category. 2 students in the good category, 10 students in the sufficient category, and 11 students in the poor category
7) The stage of concluding the material that has been studied was categorized as lacking. 2 students in the good category, 10 students in the sufficient category, and 11 students in the poor category.

Based on the results of the observer's observations of student behavior while participating in the first cycle of learning, the total score obtained was 285 out of 483 and was in a less qualified group that was not yet achieving an indicator of success.

d. Reflection

The results of reflection during the implementation of cycle I actions were the following:

1) In the learning process, there were still students who were not actively involved in group work and solving problem-solving questions. Even though it has been divided heterogeneously, the work on the questions was more dominated by students with high abilities, so students with lower abilities were less active. To overcome this, the group will still be divided heterogeneously, but the teacher must be more actively involved in guiding the students.
2) The teacher has guided and carried out all stages in learning mathematics about knowing speed, distance, and time by applying the *Means Ends Analyswas learning mode*, but there are several things that need to be reflected, namely that the teacher must be more motivating students to be involved in solving problems and guiding students, especially in the application of the Means Ends Analyswas learning model.

Means Ends Analyses showed that learning steps were still lacking, and students also did not understand the material about speed, distance, and time well. This was evident from the results of the end-of-cycle tests and observations that have been carried out; although there has been an increase, they have not yet reached the SKBM of 70. The test results show that out of 23 students, 12 passed. Meanwhile, there were 11 students who had not completed it, with an average class score of 65.65. Researchers and observers hold reflections with the intention of improving and further enhancing subsequent learning. Therefore, the researcher took the initiative to continue with cycle II.

2. Cycle II

a. Planning

Armed with the results of reflection from the learning activities carried out in cycle I, we carry out learning activities in cycle II with the hope that in learning cycle II, student learning outcomes will increase. Furthermore, the researcher prepared several things needed during the implementation of the action. Researchers do things as follows:

1) Preparation was a learning implementation plan with the subject of calculating the quotient between distance and time by applying the *Means Ends Analysis learning model*.

2) There are preparation materials and learning resources on how to calculate the quotient between distance and time.
3) Make observation sheets to observe student and teacher activities during the learning process.
4) Develop group worksheets according to the learning indicators to be achieved.
5) Compile the written tests, answer keys, and scoring guidelines given in Cycle II.

b. Implementation of actions

The implementation of cycle II actions was carried out on Wednesday, September 9, 2022, at 08.00–09.45 a.m. for the first group and Thursday, September 10, 2022, at 08.00–09.45 a.m. for the second group. In carrying out this research cycle, the teacher acts as a teacher, while the class V teacher acts as an observer. The learning was carried out with the aim of learning, namely, that students can determine the quotient between distance and time accurately.

The details of the implementation of learning start with the initial activity, namely, when the teacher greets and asks the class leader to lead his friends to pray. Then, before starting the lesson, the teacher invites students to sing the national anthem together. Next, check student attendance. The teacher explains what should be done in today's lesson. After that, the teacher held an audience by relating the past material to the material to be learned. Furthermore, the activities carried out were a series of core activities in the Learning Implementation Plan. At the core stage, the teacher applies the steps of the *Means Ends Analysis learning model*, namely as follows:

1) The teacher conveys the learning objectives to be achieved, namely that students can determine the quotient between distance and time correctly.
2) Motivate students to engage in selected problem-solving activities and explain material related to speed as the quotient between distance and time. Teachers provide motivation for students to be actively involved in learning and solving problems.
3) Students were assigned to define and organize learning tasks related to these problems. The teacher discusses examples of questions on how to find speed and, together with the students, defines the problem. How to define the problem, namely setting goals and formulating ways that must be done to solve the problem.
4) Students were grouped into 5 or 6 groups (the groups formed must be heterogeneous) and given assignments or problem-solving questions for each group. The teacher divides students into heterogeneous groups and gives them worksheets containing problem-solving questions.
5) Students were guided to identify problems, collect data, and draw conclusions. The teacher guides students to identify problems and then find the conditions needed to solve problems before connecting and drawing conclusions as answers to problems.
6) Students were asked to reflect on or evaluate their investigations and the processes they use. The teacher guides students to present their work and then reflects on the method they used to solve the problem.
7) Students were guided to conclude the material that had been studied.

In the closing activity, the activities carried out were: the teacher gave an evaluation; after that, the teacher gave moral messages; and the teacher asked the class leader to lead a prayer to end the lesson.

c. Observation

In cycle II, observations were made during the process of implementing the action. As for the results of the observations observed during the process of implementing the action, teacher activities and student activities From the whole series of learning, there

were some findings from the observer (the class teacher). The findings regarding teacher (researcher) activities carried out in cycle II were as follows:

1) In the step of explaining learning objectives, the teacher implements one indicator with good qualifications, namely writing learning objectives on the blackboard. Two indicators were categorized as sufficient: reading the learning objectives in full and explaining the learning objectives.
2) In the step to motivate students to be actively involved in problem solving activities, the teacher implements two indicators in the sufficient category, namely motivating students to be active during learning and motivating students to be involved in problem solving. While the indicators explaining the material with a heuristic approach were categorized as good.
3) In the step of helping students define and organize learning tasks related to the problems given by the teacher, implementing indicators to help students define tasks related to problem solving and indicators to help students organize tasks related to problem solving were categorized as sufficient. The indicator explains how to complete problem-solving tasks in a good category.
4) In the step of forming groups and giving assignments or problem-solving questions to each group, the teacher has carried out three indicators in the good category. Form 4-6 heterogeneous groups, give assignments or problem-solving questions to each group, and explain the worksheets that students will do.
5) In the step of guiding students to identify problems, collect data, and draw conclusions, the teacher implements two indicators with good categories, namely, guiding students to identify problems and guiding students to analyze the ways needed to solve problems. The indicator guides students to find the problem-solving requirements categorized as sufficient.
6) In the step of helping students reflect or evaluate their investigations and the processes they use, the teacher carries out two indicators in the sufficient category, namely guiding students to present problem-solving tasks that have been solved and guiding students to reflect on solving activities that have been done. Evaluate the processes that they use in the less category.

In the step of guiding students to conclude the material that has been studied, the teacher implements three indicators with sufficient categories, namely giving students the opportunity to ask questions, and together with the teacher, students conclude the subject matter and provide a moral message.

Based on the results of the observer's observations of the teacher during the second cycle of learning, the total score obtained was 52 out of 63, which was a good qualification for having achieved an indicator of success. The results of observations of student activities while participating in learning were:

1) The stage of paying attention to the teacher explaining the learning objectives and recording them was categorized as good because 8 students got the good category and 15 students got the enough category.
2) The stage of increasing the teacher's motivation to be actively involved in problem-solving activities was categorized as good because 7 students were in the good category and 16 students were in the sufficient category.
3) The stage of defining and organizing learning tasks related to the given problem was categorized as sufficient because 4 students were in the good category, 15 students were in the sufficient category, and 4 students were in the poor category.
4) The stage of forming groups and working together to complete tasks was categorized as good because 13 students were in the good category and 10 students were in the sufficient category.

5) The stages of identifying problems, collecting data, and drawing conclusions were categorized as sufficient. 3 students are in the good category, 15 students are in the sufficient category, and 5 students are in the poor category.
6) The stage of reflecting and evaluating their investigations and the processes they use were categorized as sufficient. 2 students in the good category, 16 students in the sufficient category, and 5 students in the poor category
7) The stage of concluding the material that has been studied was categorized as sufficient. 2 students in the good category, 17 students in the sufficient category, and 3 students in the poor category

Based on the results of the observer's observations of student behavior while participating in cycle II learning, the total score obtained was 342 out of 483 and was in sufficient qualification but not yet an indicator of success.

d. Reflection

From the results of observation and evaluation of the implementation of cycle II, the indicators of success that were expected have not been achieved because the results of observation and evaluation are still insufficient. The implementation of the action in cycle II has not been successful because there are still deficiencies in the implementation of the action in cycle II. The results of reflection during the implementation of cycle II actions were the following:

1) In the process of solving problems, students still have difficulty identifying problems and finding ways to solve them, and they lack confidence in answering when researchers ask questions. To overcome these problems, the teacher must guide students to better problem solving and motivate them to be confident in answering questions.
2) The teacher's asking questions to provoke students' knowledge and directing them in solving problems was still difficult for students to understand, so what the teacher had to do was give questions that were easy for students to understand.

Means Ends Analyzed learning steps had reached the sufficient category, and students had also understood quite well the material about speed as the quotient between distance and time. As was evident from the results of the end-of-cycle tests and observations that have been carried out, the test results show that out of 23 students, there were 15 who passed. Meanwhile, there were students who had not completed the class with an average grade score of 71.73. Researchers and observers hold reflections with the intention of improving and further enhancing subsequent learning. Therefore, the researcher took the initiative to continue with cycle III.

3. Cycle III

a. Planning

With the results of the reflections carried out in the learning activities of cycle I, it was hoped that the learning activities in cycle I would further increase the learning process and student learning outcomes and achieve indicators of success. Activities at the planning stage were preparing the things needed when implementing the actions of Cycle I. The things that were prepared were as follows:

1) Preparation was a learning implementation plan with the subject of knowing the relationship between speed, distance, and time by applying the *Means Ends Analysis learning model*.
2) Prepare materials and learning resources about the relationship between speed, distance, and time.
3) Make observation sheets to observe student and teacher activities during the learning process.

4) Develop group worksheets according to the learning indicators to be achieved.
5) Compile the written tests, answer keys, and scoring guidelines given in Cycle III.

b. Implementation of actions

The implementation of cycle III actions was carried out on Wednesday, September 16, 2022, at 08.00–09.45 a.m. for the first group and Thursday, September 17, 2022, at 08.00–09.45 a.m. for the second group. In the implementation of this cycle of research, the teacher acts as a teacher, while the class V teacher acts as an observer. As for the actions taken in the application of the *Means Ends Analysis learning model*, starting from the initial activity, the teacher greets and asks the class leader to lead friends. -his friend prays. Then, before starting the lesson, the teacher invites students to sing the national anthem together. Next, check student attendance. The teacher explains what should be done in today's lesson. After that, the teacher held an audience by relating the past material to the material to be learned.

In the core activities, learning was adapted to the steps of the *Means Ends Analysis learning model*, namely:

1) The teacher conveys the learning objectives to be achieved, namely that students were able to recognize the relationship between speed, distance, and time.
2) Motivate students to engage in selected problem-solving activities and explain material related to the relationship between speed, distance, and time. Teachers provide motivation for students to be actively involved in learning and solving problems.
3) Students were assigned to define and organize learning tasks related to these problems. The teacher discusses examples with students, defining the problem. How to define the problem, namely setting goals and formulating ways that must be done to solve the problem.
4) Students were grouped into 5 or 6 groups (the groups formed must be heterogeneous) and given assignments or problem-solving questions for each group. The teacher divides students into heterogeneous groups and gives them worksheets containing problem-solving questions.
5) Students were guided to identify problems, collect data, and draw conclusions. The teacher guides students to identify problems and then find the conditions needed to solve problems before connecting and drawing conclusions as answers to problems.
6) Students were asked to reflect on or evaluate their investigations and the processes they use. The teacher guides students to present their work and then reflects on the method they used to solve the problem.
7) Students were guided to conclude the material that had been studied.

In the final activity, the teacher gives an evaluation in the form of multiple-choice questions with 10 numbers. After that, the teacher gave moral messages and asked the class leader to lead a prayer to end the lesson.

c. Observation

The things that were observed in the implementation of cycle III were the implementation of the *Means Ends Analysis learning model*, teacher activities, and teacher activities in learning. The findings regarding teacher (researcher) activities carried out in cycle III were as follows:

1) In the step of explaining the learning objectives, the teacher carries out two indicators with good qualifications: writing the learning objectives on the blackboard and reading out the learning objectives in full. The indicator explains the learning objectives adequately.
2) In the step to motivate students to be actively involved in problem solving activities, three indicators were in the sufficient category: motivating students to be active

during learning, motivating students to be involved in problem solving, and explaining material with a heuristic approach.

3) In the step of helping students define and organize learning tasks related to the problems given by the teacher, implementing indicators to help students define tasks related to problem solving and indicators explaining how to complete problem solving tasks in a good category Indicators help students organize tasks related to problem solving that are categorized as sufficient.
4) In the step of forming groups and giving assignments or problem-solving questions to each group, the teacher has carried out three indicators in the good category. Form 4-6 heterogeneous groups, give assignments or problem-solving questions to each group, and explain the worksheets that students will do.
5) In the step of guiding students to identify problems, collect data, and draw conclusions, the teacher implements three indicators in a good category, namely, guiding students to identify problems, guiding students to analyze the methods needed to solve problems, and guiding students to find conditions for problem solving.
6) In the step of helping students to reflect on or evaluate their investigations and the processes they use, the teacher carries out three indicators in a good category: guiding students to present problem-solving tasks that have been solved, guiding students to reflect on problem-solving activities that have been carried out, and evaluating the processes they use.
7) In the step of guiding students to conclude the material that has been studied, the teacher implements three indicators with sufficient categories, namely giving students the opportunity to ask questions, concluding the subject matter together with the teacher, and providing a moral message.

Based on the results of the observer's observations of the teacher during the first cycle of learning, the total score obtained was 60 out of 63 and was in good qualification (B), already achieving an indicator of success. The results of observations of student activities while participating in learning were:

1) The stage of paying attention to the teacher explaining the learning objectives and recording them was categorized as good because 16 students got the good category and 7 students got the enough category.
2) The stage of increasing the teacher's motivation to be actively involved in problem-solving activities was categorized as good because 19 students were in the good category and 4 students were in the sufficient category.
3) The stage of defining and organizing learning tasks related to the given problem was categorized as sufficient because 8 students were in the good category, 14 students were in the sufficient category, and 1 student was in the poor category.
4) The stage of forming groups and working together to complete tasks was categorized as good because 16 students were in the good category and 7 students were in the sufficient category.
5) The stages of identifying problems, collecting data, and drawing conclusions were categorized as good. 14 students are in the good category, 8 students are in the sufficient category, and 1 student is in the poor category.
6) The stage of reflecting and evaluating their investigations and the processes they use were categorized as good. 13 students in the good category, 10 students in the sufficient category
7) The stage of concluding the material that has been studied was categorized as sufficient. 10 students in the good category, 12 students in the sufficient category, and 1 student in the poor category

Based on the results of the observer's observations of student behavior while participating in cycle III learning, the total score obtained was 415 out of 483 and was a good qualification for having achieved an indicator of success.

d. Reflection

Based on the results of teacher and student observations, after implementing cycle III learning, which was carried out by applying the steps of the *Means Ends Analysis learning model*, it has shown a significant increase when compared to the previous cycle. Based on the results of observations made by observers, the implementation of Cycle III on teacher and student observations has reached the good category.

The results of the evaluation test given showed that of the 23 students who were the subject of the study, 19 had achieved the SKBM of 70. Meanwhile, four students had not completed it. From these results, it was found that the increase in Mathematics learning outcomes, especially in the material for addition of fractions by applying the *Means Ends Analysis learning model,* had increased from the previous cycle and had achieved success indicators of ≥ 76% of students who obtained grades ≥ 70. Class average grades also increased. Seeing these conditions, the research in Cycle III was determined to be successful. Or, in other words, the action hypothesis that has been formulated previously has been achieved, namely, *if the Means Ends Analyswas* learning model can be applied properly, then student learning outcomes in Mathematics about speed, distance, and time in class V UPT SDN 3 Amparita can increase.

The results of the study, which consisted of teacher and student activities in learning mathematics by applying the *Means Ends Analysis learning model*, experienced an increase. This was evident from the results of observations in learning and the results of evaluation tests conducted at the end of each learning cycle. In cycle I, the class situation was chaotic because students did not understand what to do and were not familiar with the *Means-Ends Analysis process.* Many students were not serious about learning Mathematics because teachers do not involve and guide students in problem solving. Even though problem solving abilities were very important to understand, students were also not able to analyze the problems given, which was in line with the opinion of Sumarno (2002), who said that Mathematics needs to be studied to deal with these two different times, namely facing the present and preparing plans for facing the future. To deal with the present, learning mathematics leads to an understanding of mathematics and other sciences. To meet future needs requires more ability and effort, namely through logical reasoning, analysis, systematic thinking, being careful, critical, and open-minded in everyday life, and to face uncertain future challenges. Therefore, learning mathematics in elementary schools should train students to develop their analytical and thinking abilities (Nurhadi, 2017). Thwas, in accordance with what was stated (Sayogi et al., 2015), also assumes that in the syntax of the Means Ends Analyswas learning model, the problem can be solved in a directed manner, especially in the aspect of finding solutions. Students can also solve problems by solving problems into simple sub-subs until the goal of the problem is achieved, and then students conclude that the goals obtained were correct (Palupi, 2016). The process carried out by students in solving problems was carried out in stages, meaning that from the problems given, sub-problems were made, which were then solved one by one by students so that they did not burden them (Magdalena & Surya, 2017). In practice, the Means Ends Analyswas learning model in the experimental group related to the syntax or steps contained in the model was very suitable for meaningful learning because the model emphasizes the activeness and skill of students in solving problems whether done independently or in groups. Besides that, in implementing the model, students fully contribute or play a direct and active role in learning activities while

the teacher is only a facilitator while still guiding if there are students who experience difficulties in solving problems.

The processes in cycle I carried out by the teacher and student activities cannot be said to be successful. In the implementation of learning, there were still various deficiencies made by the teacher and a lack of student participation. As seen from the student learning outcomes in the first cycle evaluation, only 12 out of 23 students achieved the SKBM. This means that the percentage of success from cycle I was still in the lower category because it was continued in cycle II. In cycle II, the *Means Ends Analysis process* in learning has been going quite well; students were getting used to what to do, but there were still some students who seemed not to be actively involved in learning, while the teacher's activities can already be classified in the good category. Student learning outcomes seen from the evaluation test results in cycle II showed that 15 out of 23 mean that the completeness of student learning outcomes has only reached the sufficient category.

In cycle III, the process of *means-end analysis* in learning has gone well, which is because students were previously familiar with the *means-end analysis process* in cycles I and II. In addition, overall, students look active because they already have an idea about the learning that will be carried out in Cycle III. Teacher activity can also be classified in the good category. *The Means Ends Analysis* learning model, according to Herawanti and Mintohari (2017), has the goal of making students participate actively when learning. so students will be more active in learning activities while educators become facilitators and motivators. This causes students' understanding of the material's speed, distance, and time to increase.

Improved learning outcomes can be seen from the results of student evaluation tests in cycle III, which showed that 19 out of 23 students had achieved a score of 70 or had achieved an SKBM. This means that the application of the *Means-Ends Analysis learning model* can improve student learning outcomes. In line with that, Herawanti and Mintohari (2017) argue that learning outcomes are abilities that students acquire after carrying out learning. Thus, if students were given the same material, it would make them remember the learning experiences they have had. Learning outcomes were often interpreted as the culmination of the learning process that determines success in achieving a material.

The Means Ends Analyswas learning model can improve the mathematics learning outcomes of class V UPT SDN 3 Amparita. By looking at the indicators of success that have been set, the research has been successful, so the research in cycle III was stopped. In this way, the hypothesis developed by the researcher, namely that if the *Means Ends Analysis learning model* was applied, it could improve the process and learning outcomes of Mathematics for class V UPT SDN 3 Amparita was proven.

Conclusion

Based on the results of the research and discussion, it can be concluded that the application of the *Means Ends Analysis learning model* can improve the process of learning mathematics about material speed, distance, and time in class V UPT SDN 3 Amparita based on observations of teacher teaching activities and student learning activities each cycle. *The Means Ends Analysis* learning model can improve student learning outcomes in mathematics regarding material speed, distance, and time in class V UPT SDN 3 Amparita with data obtained from the results of the learning outcomes tests in cycles I, II, and III.

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