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Application of the Guided Discovery Learning Model to Improve Student Learning Outcomes in Fractions Division Material

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Abstract

This study aims to obtain a description of the application of the guided discovery learning model to improve student learning outcomes in the matter of dividing fractions in the VA class of SDN 5 Palu. This type of research is Classroom Action Research (PTK) which refers to the research design of Kemmis and Mc. Taggart, namely (1) planning, (2) implementing actions, (3) observation, and (4) reflection. The subjects in this study were all students of VA class at SDN 5 Palu for the 2022/2023 school year with a total of 24 students consisting of 14 female students and 10 male students. The type of data in this study is qualitative data supplemented by quantitative data. Qualitative data collection techniques in this study were observation, interviews, and field notes. The quantitative data collection technique in this study was a written test. This research was conducted in two cycles. The results of the study show that learning with the guided discovery learning model could increase students' learning outcomes of VA Class of SDN 5 Palu on the matter of division of fractions. This is evidenced by the increase in student learning outcomes from cycle I to cycle II. The learning outcomes of the first cycle were obtained at 62.5%, and the second cycle was obtained at 83.33%. The results of the analysis of the observation sheet of teacher and student activities in cycle 1 were in the sufficient category. In cycle 2, the teacher and student activity observation sheet increased because the teacher activity observation sheet was in the very good category and the student activity observation sheet was in the good category, so that the success indicators of the action have been achieved.

Keywords: guided discovery, learning outcomes, division of fractions

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INTRODUCTION

Mathematics is a science that plays an important role in human life, from simple things to very complex things. *"Mathematics is the queen as well as the servant of all sciences"* (Mathematics is the queen and servant of all sciences). As queen, mathematics seems to reign above all sciences because mathematics develops without being based on other sciences. As a servant, mathematics serves other sciences that use mathematics in their own research and development. This causes mathematics to occupy a central position in the world of science (Susilo, 2012). Therefore, mathematics is taught at all levels of education from elementary, secondary, and tertiary education.

One relevant empirical study that supports the difficulty faced by students in understanding the concept of fractions is the research conducted by Purnomo, Fitriani, and Saptarini (2020). This study aimed to determine the level of mathematical reasoning ability of elementary school students in solving fraction problems. The results showed that students in grade 5 and 6 had low levels of mathematical reasoning ability in solving fraction problems. Furthermore, the study found that students' difficulties in understanding fractions were

caused by their inability to represent fractions as a part of a whole and their lack of understanding of the relationship between numerator and denominator. This supports the claim that the difficulty in understanding fractions is not only limited to SDN 5 Palu but also occurs in other schools.

Another empirical study that supports the claim that the conventional teaching method used by teachers is one of the factors that contribute to students' difficulty in understanding fractions is the research conducted by Zainuddin et al. (2020). This study aimed to explore the effectiveness of the implementation of blended learning in mathematics learning. The results showed that the implementation of blended learning in mathematics learning was more effective in improving students' understanding and learning outcomes compared to the conventional learning method. The study suggests that blended learning can be an alternative method to overcome the limitations of the conventional learning method and can be used to enhance students' understanding of mathematical concepts, including fractions.

The lack of understanding of fractions and the difficulty in solving problems related to fractions have a significant impact on students' test scores. This is supported by the research conducted by Pahlevi et al. (2020), which aimed to determine the effect of contextual teaching and learning on students' mathematical problem-solving ability. The results showed that students who were taught using contextual teaching and learning had higher mathematical problem-solving abilities compared to those who were taught using conventional methods. The study suggests that contextual teaching and learning can be an effective method to improve students' mathematical problem-solving abilities, which includes solving problems related to fractions.

In connection with these problems, we need a learning model that can overcome these problems. Guided discovery learning model is one of several alternatives that can improve student learning outcomes (Saragih & Arfiati, 2012; Nasruddin et al., 2020; Gollu et al., 2022), conceptual understanding and critical thinking (Muhali et al., 2021). This learning model can make students actively involved in working together in searching, exploring, experimenting, and investigating from various situations to find and construct new ideas and knowledge, based on various sources of information and initial knowledge or concepts that have been mastered before, and then conclude, test the conclusions and provide a report on the results of his work. Nasri. et al (2015) stated that in the learning process of the guided discovery model, students are expected to discover concepts. In this learning process students are encouraged to think and analyze themselves, so they can find concepts based on the materials and data that have been provided. Then according to Afni, R. et al (2017) states that the guided discovery learning model is a learning model that can directly involve students actively where the teacher gives examples of specific topics and guides students to understand the topic. This means that the guided discovery model makes students more actively involved in investigating, investigating, trying, and finally discovering the mathematical concept in question.

Learning with the guided discovery model can be carried out individually or in groups. This model is very useful for mathematics subjects according to the characteristics of mathematics. The teacher guides students when needed and students are encouraged to think for themselves so that they can find general principles based on the material provided by the teacher and to what extent students are guided depends on their ability to the material being studied (Akina, 2020). According to Markaban (2008) the advantages of the guided discovery model in learning are: 1) students can actively participate in the learning presented, 2) foster and add an attitude of inquiry (search and find) 3) support students' *problem solving* abilities, 4) provide a vehicle for interaction between students, as well as students with teachers, thus students are also trained to use good and correct Indonesian, 5) the material studied can reach a higher level of ability and last longer because students are involved in the process of discovering it.

Based on the formulation of the problem above, the purpose of this research is to obtain a description regarding the application of the guided discovery learning model that can improve student learning outcomes in the division of fractions material in grade fifth of SDN 5 Palu.

METHODS

The research approach used is a qualitative research approach. A qualitative approach produces written and oral data from the activity or behavior of the subject observed during the learning process. This approach is also used because researchers want to investigate and present data according to what happened during the research.

This type of research is Class Action Research (PTK). Researchers chose this type of research because researchers are directly involved in the learning process to understand problems that occur in class and then make improvements to improve the quality of learning and find forms of teaching that are appropriate to the problems faced in class.

The research design refers to the classroom action research model developed by Kemmis and Mc. Taggart (Depdikbud, 1999). Each cycle that is carried out consists of four components, namely *planning* (planning), *acting* (action), *observing* (observation) and *reflecting* (reflection). This research was conducted at SDN 5 Palu. This research was conducted in the odd semester of the 2022/2023 academic year. The research subjects were all VA class students at SDN 5 Palu who were enrolled in the 2022/2023 academic year consisting of 24 students, namely 10 male students and 14 female students, this was because the VA class students were more heterogeneous in terms of academic ability and gender .

The type of data in this study is qualitative data supplemented by quantitative data. Qualitative data collection techniques are carried out by means of observation, interviews, and field notes. Quantitative data collection techniques are carried out by means of a written test in the form of essay test of 6 numbers. The qualitative data analysis technique used refers to the Miles and Huberman model (Sugiono, 2011), namely *data reduction* , *data display* , conclusion *drawing* /verification. Quantitative data analysis techniques are obtained from student work results and adjusted to the Minimum Completeness Score (SKM) in schools, using the following formula:

$$\text{NA} = \frac{Scores\ obtained\ by\ students}{Maximum\ score\ of\ questions} \times 100$$

Information:

NA : Completeness Test Results

This research is said to be complete if students have achieved the Minimum Mastery Criteria (KKM), namely 65. If students' classical completeness has reached 65% of all students, then student learning outcomes in a classical manner have been well achieved. Classical learning completeness can be determined by using the following formula:

$$\text{CBC} = \frac{The\ Number\ Of\ Completed\ Students}{Total\ number\ of\ students} \times 100\%$$

Information:

KBK: Results of Mastery Learning Classical

This research action is said to be successful if students have met the indicators of research success in cycle I and cycle II which were obtained from the final action test. Indicators of success in cycles I and II are if the percentage of classical learning completeness obtained by students is 65%, and according to the KKM that applies in SDN 5 Palu, which is 65. Actions are also said to be successful if students understand the material for dividing fractions. This can be seen if the student (informant) is able to answer the test correctly and when asked about his answer he is able to explain it.

The success of the action can also be seen from the teacher's activities in managing learning in class and student activities while participating in learning using the guided discovery learning model. Teacher and student activities in participating in the learning

process are declared successful if the average value (NR) of teacher and student activities reaches 70% in the good or very good category. Categories of assessment criteria for teacher and student activities:
NR ≥ 90% = Very Good
90% > NR ≥70% = Good
70% > NR ≥ 50% = Enough
50% > NR ≥ 30% = Less
0% ≤NR <30% = Very Less
Ministry of National Education in (Month, 2017).

RESULTS AND DISCUSSION

Pre Action Results

The research conducted was classroom action research (PTK). In this study, the researcher acted as the executor of the action and the one who acted as the observer was Mrs. Niluh Risnawati, S.Pd as the class teacher as well as the mathematics subject teacher for the VA class of SDN 5 Palu. Through discussions conducted by researchers with class teachers who are also mathematics subject teachers for class VA SDN 5 Palu, information was obtained that student learning outcomes in mathematics, especially in fractional arithmetic operations were very low.

Table 1 Results of Analysis of Daily Deuteronomy Values Before Action

No	Acquisition Aspect	Results
1	Highest Score	80
2	Lowest Score	20
3	SNumber of Students	24
4	Number of Completed Students	10
5	Number of Unfinished Students	14
6	Percentage of Mastery of Classical Learning	41.67 %

The results of the analysis show that only 10 students complete, and 14 other students do not complete. The classical learning completeness obtained was only 41.67% and had not yet reached the indicator set by the school, which was 65% . This shows that students have not been able to understand the material conveyed by the teacher properly, because the method used by the teacher in teaching is still conventional . Therefore, the researcher will carry out learning actions by applying the guided discovery learning model to the material for dividing fractions in the VA class of SDN 5 Palu.

Results of Action Implementation

Cycle I

Learning in cycle I was carried out in three meetings. Learning in the first and second meetings discussed the material for the distribution of ordinary fractions and the third meeting carried out the final action test. The form of the final test of the first cycle of action was in the form of a description test which consisted of 6 questions, 24 students took the test.

Table 2 Results of Cycle 1 Final Action Test Analysis

No	Acquisition Aspect	Results
1	Highest Score	86.6
2	Lowest Score	34
3	The number of students	24
4	Number of Completed Students	15
5	Number of Unfinished Students	9
6	Percentage of Mastery of Classical Learning	62.5 %

Through the results of the final cycle I action test, data was obtained that as many as 15 students completed, while 9 other students did not complete because they did not reach the KKM that had been determined by the school, namely 65. The percentage of classical completeness obtained was 62.5% did not reach the indicators indicated determined by the school is 65%. This shows that the research in cycle I was not successful because it had not yet reached indicators of action success.

Based on data from observer observations of teacher (researcher) activities, with the following details:

(i) Very good assessment given by observers, namely 4 aspects of the 21 existing aspects.
(ii) The good assessment given by observers is 8 aspects of the 21 existing aspects.
(iii) The poor rating given by the observer is 9 aspects of the 21 existing aspects.

Because there are 4 aspects in the very good category, 8 aspects in the good category, and 9 aspects in the less category, it can be concluded that the teacher's activities in cycle I were in the sufficient category, so that they did not meet the criteria for successful action.

Based on data from observer observations of student activities, with the following details:

(i) Very good assessment given by observers, namely 3 aspects of the 21 existing aspects.
(ii) The good assessment given by the observer is 6 aspects of the 21 existing aspects.
(iii) The poor rating given by the observer is 12 aspects of the 21 existing aspects.

Student activity in cycle I with 3 aspects categorized as very good, 6 aspects categorized as good and 12 aspects categorized as lacking. So it can be concluded that the activity of students in cycle I did not meet the criteria for the success of the specified action, because it was still in the sufficient category.

Based on the results of interviews with informants, it was concluded that students were still wrong in completing the given LKPD. Students are still wrong in carrying out fractional arithmetic operations, determining fractional values through pictures, not following the existing problem instructions properly, and lacking time in solving problems. The results of the first cycle of field notes provided information that at the beginning of learning students only paid attention to the researcher, not the material presented. Then when the learning took place, some students were not happy with the group members or partners divided by the researcher, the reason being that the group mates or partners were not close friends. Furthermore, when the researcher asked several questions, there were still students who were shy and hesitated to convey their knowledge. Also, there are still some students who are confused when filling out the LKPD. Learning is still dominated by students with high abilities. The class atmosphere was not very orderly, because many students moved around to discuss their work or borrow stationery.

Reflection

Reflection activities are carried out to find out the weaknesses and strengths that occurred in the implementation of cycle I and used as material for improvement in cycle II activities. Reflection was carried out based on data from the results of the final test analysis, data from observations of teacher activities and student activities, results of interviews, and field notes. The results of the analysis of the final test of the first cycle of action showed that the students' classical learning completeness, which was 62.5% , had not yet reached the indicator set by the school, which was 65%. Therefore, in cycle II the researcher must be able to adjust the learning time with student activities and make students more interested in participating in learning by applying the guided discovery learning model so that the material conveyed by researchers can be understood and remembered by students.

Observational data on teacher (researcher) activity shows that researchers are still less skilled in giving apperception to students. Therefore, for cycle II the researcher must try to provide apperception to students more clearly and interestingly so that students can pay close attention. Observation data on student activities shows that in learning activities there are still

some students who play and do not actively participate in learning activities. Therefore, in cycle II the researcher must be able to create learning situations that are more attractive to students so that they can actively participate in learning activities.

Based on data from interviews with informants, it was concluded that students were still wrong in performing fractional calculation operations, determining fractional values through pictures, not following the instructions correctly, and lacking time in solving problems. Therefore, this will be the basis for improvement for researchers in carrying out cycle II. Researchers must explain the things that must be done by students on each test more clearly and easily understood. Based on the results of cycle I field notes, in cycle II the researcher had to supervise and manage the process of student collaboration in groups.

Cycle II

Learning in cycle II was carried out in three meetings. Learning in the first and second meeting discussed the distribution of various forms of mixed fractions and the third meeting carried out the final action test. The form of the final test of the second cycle of action was in the form of a description test consisting of 6 questions, 24 students took the test.

Table 3 Results of the final cycle II test analysis

No	Acquisition Aspect	Results
1	Highest Score	100
2	Lowest Score	45.5
3	The number of students	24
4	Number of Completed Students	20
5	Number of Unfinished Students	4
6	Percentage of Mastery of Classical Learning	83.33 %

From the results of the final cycle II action test, data were obtained that as many as 20 students were able to complete the questions well in accordance with the minimum completeness criteria (KKM), namely 65, while 4 students could not solve the questions properly. These results indicate the successful implementation of learning in cycle II. The percentage of classical learning completeness of 83.33% indicates that the specified success indicator has been achieved, namely 65%.

Based on data from observer observations of teacher (researcher) activities, with the following details:

(i) Very good assessment given by observers, namely 18 aspects of the 21 existing aspects.
(ii) The good assessment given by observers is 3 aspects of the 21 existing aspects.

Because there are 18 aspects in the very good category and 3 aspects in the good category, it can be concluded that the teacher's activities in cycle II have fulfilled the specified action success criteria.

Based on data from observer observations of student activities, with the following details:

(i) Very good assessment given by observers, namely 8 aspects of the 21 existing aspects.
(ii) The good assessment given by observers is 13 aspects of the 21 existing aspects.

Student activity in cycle II with 8 aspects categorized as very good and 13 aspects categorized as good. So it can be concluded that student activity in cycle II has met the specified success criteria of action .

Based on the results of interviews with informants, it was concluded that students had a better understanding of the material being taught with the guided discovery learning model, because they learned more actively, understood where their mistakes were, and were able to find their own solutions to the problems formulated in tests. However, there are still some mistakes made by students in completing tests caused by students making mistakes in performing arithmetic operations, and not being careful in writing answers. The results of field notes provide information that during learning students can learn more in an orderly manner, and can receive directions from researchers well. When students were directed to

form groups according to groups at cycle I meetings, students began to get boisterous because they were busy moving places. During the work on the LKPD, each group participated well, even though there were some members from each group who did not participate enough. But in cycle II, the learning process took place better than the learning process in cycle I.

Reflection

After all the activities in cycle II were carried out, the researcher returned to reflect on all learning activities which aimed to find out the weaknesses and strengths that occurred in the implementation of cycle II.

Based on the results of the interviews, information was obtained that students had a better understanding of the material taught by the guided discovery method, because they learned more actively, and were able to find their own solutions to the problems formulated in tests . But there are still some mistakes made by students in completing the tests given. Students make mistakes in carrying out arithmetic operations, are not careful in answering, and lack time in solving questions.

Based on the results of observations of teacher (researcher) activities by observers, information was obtained that the ability of researchers to manage learning using the guided discovery method had increased. Researchers have been able to minimize student commotion by going around supervising student activities. Furthermore, based on observer observation data on student activities in the learning process, it shows that in general the ability of students to understand the material has increased. Most of the students in the group were actively involved and worked well together.

Apart from observational data, an analysis of the final cycle II action test also showed an increase. There were 20 students who obtained a complete score and 4 students did not complete. From the results of the analysis, student errors occur due to errors in number arithmetic operations, but in general students are able to understand the material well. Based on the things above, it indicates that learning activities have increased and indicators of successful action have been achieved in cycle II.

Discussion

The results of the research that has been carried out provide information that the guided discovery learning model can improve student learning outcomes in the matter of dividing fractions in the VA class of SDN 5 Palu . This is evidenced by the percentage of students' classical learning completeness increasing from 41.67% to 83.33%. This research went through two cycles, each cycle was carried out in several stages, namely: 1) planning , *2*) acting , 3) observing , and 4) reflection , as stated by Kemis and Mc. Taggart (Department of Education, 1999).

In the problem formulation phase, the researcher provides information on the subject matter and an explanation of the things to be studied. Researchers gave problems to students in the form of worksheets which were worked on in groups. After each group received the LKPD, the researcher explained the things students would do with the help of the LKPD. In accordance with the opinion of Yusnawan (2014) which states that giving LKPD to each group in the implementation of learning aims to guide and encourage students in the discovery process and can develop students' creativity in learning, so that it can guide students to make conclusions from the material being taught.

data processing and conjecture preparation phase , the researcher observing and supervising students compiling, processing, organizing and analyzing the problems given. This is in accordance with the opinion of Sari (2014) who argues that at the stage of data processing and constructing conjectures, students compose, process, organize and analyze - data. In the conjecture verbalization phase, the researcher asked students to present the conjecture results from each group. The researcher chose a representative from each group to present the results of their group's work in front of the class. The researcher invites students

to discuss the answers that have been presented. Students can respond and ask the group that presents their answers in front of the class if something is not understood . This fits the Pugalee in Rahmawati (2013) which states that in learning mathematics students need to be accustomed to providing arguments for each answer and providing responses to answers given by others, so that what is learned becomes more meaningful for students.

Activities in the feedback phase, namely, the researcher gives practice questions I to students to work on individually, and asks students to work on them in an orderly manner without being guided by the researcher and not disturbing their friends. This is in accordance with the opinion of Al-Asmari and Alshumrani (2020) who stated that practice questions are an effective method to improve students' understanding and learning outcomes in mathematics. The study suggests that practice questions can be used as a formative assessment tool to monitor students' progress and provide feedback to both students and teachers.

During the learning process by applying guided discovery learning model in cycle I, the researcher experienced problems at the stage of hypothesis preparation because not all students actively engaged in the group to make hypotheses and draw conclusions from observations, and some students were still playing. In addition, at the stage of verbalizing hypotheses, students were less active in asking questions or responding to presentations from other groups. In cycle II, the learning process by applying guided discovery learning model was better. During the learning process, students were more actively involved in collaborating in groups to formulate and draw conclusions on given problems, and they were more active in asking questions or responding to presentations from other groups. The findings of this study are consistent with previous research that has shown the effectiveness of the guided discovery learning model in enhancing students' learning outcomes. In a study by Nur et.al. (2020), it was found that the use of guided discovery learning model can improve students' problem-solving skills, mathematical reasoning, and conceptual understanding. Similarly, a study by Pratiwi et al. (2019) demonstrated that the application of the guided discovery learning model can improve students' achievement in mathematics, as well as their self-confidence and motivation towards learning.

In the field implementation, cycle I and cycle II were held in three meetings. The first and second meetings in cycle I discussed the material for dividing common fractions, and the first and second meetings in cycle II discussed the material for dividing mixed fractions. The third meeting in cycle I and cycle II carried out the final action test. The implementation of learning activities in cycle I and cycle II was divided into two meetings because the time in one lesson was not enough to complete the phases of the guided discovery learning model so the researcher continued in the next lesson on the same day. Based on the researcher's experience, this is caused by the large number of activities contained in each phase of the guided discovery learning model which are not suitable for learning time, in addition to that the questions in the LKPD are too many so that they spend a lot of learning time, and there is no student readiness to learn. using the guided discovery learning method because students are used to learning with conventional methods. According to research conducted by Rezky (2019), the results showed that the implementation of the guided discovery learning model in mathematics learning was able to improve students' critical thinking skills. Another study by Nugraha, Kusuma, and Astuti (2020) found similar results, that the implementation of the guided discovery learning model in fraction learning was able to improve students' learning outcomes. In addition, research conducted by Suherman et al. (2018) showed that the implementation of the guided discovery learning model in mathematics learning was able to improve students' problem-solving abilities and creativity. Therefore, the implementation of the guided discovery learning model in mathematics learning should continue to be developed and applied to improve students' learning outcomes.

It was found that only 15 of the 24 students who took the test completed the test. The percentage of students' classical learning achievement is only 62.5%, this result shows that

students' ability to understand and complete LKPD still have not reached the indicators of success of the actions that have been determined . There are still some students who make mistakes in solving questions . mistakes what students do including mistakes in determining fractional values , not following the instructions properly , mistakes in performing fractional calculation operations, and lack of time in solving problems. Therefore, this is the basis for improvement for researchers in carrying out cycle II. Researchers must explain things that must be done by students more clearly and easily understood. The study conducted by Alhassan and Abdul-Moomin (2021) entitled "Investigating the Relationship between Students' Performance in Mathematics and Learning Styles: The Case of Senior High Schools in Ghana" supports this findings. The study found that there is a significant relationship between students' learning styles and their performance in mathematics. The results also showed that students who use visual and kinesthetic learning styles tend to have better mathematics performance than students who use the auditory learning style. Therefore, when teaching mathematics, it is important for teachers to pay attention to students' learning styles and adapt appropriate teaching methods to improve students' learning outcomes.

This study demonstrates that the application of guided discovery learning model is effective in improving student learning outcomes in the topic of fraction division. The results of the study show that in cycle II, 20 out of 24 students passed the test, indicating a significant improvement compared to cycle I. In addition, the classical learning mastery percentage in cycle II reached 83.33%, indicating that most of the students have achieved the predetermined mastery standard. These findings are in line with previous studies which have shown that guided discovery learning model can improve students' understanding of concepts and learning outcomes. Therefore, it can be concluded that the application of guided discovery learning model can be an alternative in improving student learning outcomes in the topic of fraction division. A previous study supporting the findings of this research was conducted by Santoso and Nugroho (2020), which showed that the application of the guided discovery learning model improves student learning outcomes in mathematics, particularly in the concept of integers. Similar findings were also obtained by Wahyuni and Indriani (2021) in their research that used the guided discovery learning model in geometry. Their research showed a significant improvement in students' understanding of concepts and learning outcomes. In addition, the guided discovery learning model has also been proven effective in improving student motivation and interest in learning in several previous studies. For example, research conducted by Khotimah, Faridah, and Sukarmin (2019) showed that the guided discovery learning model can improve student motivation and learning outcomes in trigonometry. Thus, it can be concluded that the application of the guided discovery learning model in fractions division material is not only effective but also consistently proven to improve student learning outcomes in various mathematics topics and materials.

Based on the results of observations made by observers, information was obtained that in the implementation of learning by applying the guided discovery learning model to teacher activities and student activities showed an increase from cycle I to cycle II. The increase can be seen from the results of the analysis in the first cycle of observation sheets of teacher and student activity which are still in the sufficient category. While the results of the analysis in cycle II the teacher activity observation sheets were in the very good category and the student activity observation sheets were in the good category. So it can be concluded that the observation sheet of teacher and student activities has increased and has met the indicators of action achievement. Similar findings were also obtained in the study conducted by Sari and Rofiah (2020), which showed that the application of the guided discovery learning model on probability material could improve student learning outcomes. Their research showed a significant increase in concept understanding and student learning outcomes, from 61.11% to 87.5% after using the guided discovery learning model. In addition, the study conducted by Sari and Siswanto (2019) also showed similar results on the use of guided discovery learning model on triangle material, where there was an increase in student learning outcomes from

69.23% to 87.5%. From these research findings, it can be concluded that the consistent application of the guided discovery learning model can improve student learning outcomes in various mathematical materials and topics.

Based on the results of the cycle I interviews, information was obtained that students were still wrong in completing the given LKPD. The student is mistaken in determining the value of a fraction through a picture , is mistaken in carrying out a fraction arithmetic operation , does not follow the instructions on the questions correctly , and lack of time to solve the problem. While the results of cycle II interviews obtained information that students had better understood the material being taught by the guided discovery method, because students studied more actively, and were able to find their own solutions to the problems formulated in LKPD. There are several research journals that support the findings of this study. For example, the research conducted by Rukayah et al. (2021) showed similar results on the application of guided discovery learning model in geometry, where there was an increase in student learning outcomes from 63.63% in the pre-test to 87.37% in the post-test. In addition, the research conducted by Anshari et al. (2020) also showed supporting results on the use of guided discovery learning model in physics, where there was an increase in student learning outcomes from 75.7% to 90.1%. The findings from these studies support the conclusion of this study that the consistent application of guided discovery learning model can improve student learning outcomes in various subjects and topics.

Based on the results of the first cycle of field notes, it was found that at the beginning of learning students only paid attention to the researcher , not the material presented . Then when the learning took place, some students were not happy with the group members or partners divided by the researcher, the reason being that the group mates or partners were not close friends. Furthermore, when the researcher asked several questions, there were still students who were shy and hesitated to convey their knowledge. Also, there are still some students who are confused when filling out the LKPD. Learning is still dominated by students with high abilities. The class atmosphere was not very orderly, because many students moved around to discuss their work or borrow stationery. While the results of cycle II field notes obtained information that when learning begins, students can study more orderly, and can receive directions from researchers well. When students were directed to form groups according to the groups at cycle I meetings, students began to get boisterous because they were busy moving places. During the work on the LKPD, each group participated well, even though there were some members from each group who did not participate enough. But in cycle II, the learning process took place better than the learning process in cycle I.

Based on the results and discussion above, it can be concluded that the activities of teachers and students in learning have increased and indicators of successful action have been achieved. This shows that there is an increase in the learning outcomes of class VA students at SDN 5 Palu in the matter of dividing fractions by applying the guided discovery learning model. Another journal review that supports this research is the study conducted by Ayub et al. (2018), which also shows that the application of guided discovery learning model can improve student learning outcomes. The study was conducted in Pakistan on seventh-grade students and showed a significant increase in mathematics learning outcomes after applying the guided discovery learning model. Similar results were also found in a study conducted by Ismail and Awang (2017) in Malaysia on fifth-grade students in mathematics learning. This indicates that the guided discovery learning model can be an effective option in improving student learning outcomes in mathematics learning.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the application of the guided discovery learning model can improve student learning outcomes in the matter of dividing fractions in class VA SDN 5 Palu by implementing the stages, namely: 1) Formulating problems, 2) Data processing, 3) Preparation of conjectures, 4) Examination of

conjectures, 5) Verbalization of conjectures, and 6) Feedback. This statement is proven by the research results obtained, namely, in the first cycle, classical learning mastery was 62.5%, classical absorption was 66.84%. In cycle II, the results of classical learning mastery were 83.33%, and classical absorption was 78.66%. In addition, based on the results of observations of teacher activities and student activities in the implementation of learning by applying the guided discovery learning model, it showed an increase from cycle I to cycle II. The results of the analysis in cycle I on the observation sheet of teacher and student activity were in the sufficient category and did not meet the indicators of success of the action. In cycle II the teacher activity observation sheets and student activity observation sheets increased and were in the very good and good categories, so that they met the specified success indicators .

RECOMMENDATIONS

Based on the researcher's experience, for further research by applying the guided discovery learning model to mathematics subjects, careful preparation is needed from both researchers and students. Researchers must be able to adjust the available learning time with the activities of each phase of the guided discovery learning model. In addition, the number of questions given in the LKPD must also be adjusted according to the time of study.

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