

**THE IMPLEMENTATION OF *DISCOVERY LEARNING* (DL) MODEL TO IMPROVE THE SECOND GRADERS' MATHEMATICAL CONCEPTS UNDERSTANDING ON COMPARING NUMBER MATERIALS AT SDN BALAGEDOG III**

**Fuji Alfiani<sup>1</sup>, Faridillah Fahmi Nurfurqon<sup>2</sup>, Muhamad Ghiyats Ristiana<sup>3</sup>**

<sup>1</sup>SDN Balagedog III, Majalengka, Indonesia

<sup>2,3</sup>Elementary School Teacher Education IKIP Siliwangi, Cimahi, Indonesia

\*[fujialfiani78@gmail.com](mailto:fujialfiani78@gmail.com)

**ABSTRACT**

This research was motivated by the low score of second grade students' test results on the matter of comparing numbers. This study aims to describe the Discovery Learning model that is implemented to solve the problem of students' low mathematical comprehension abilities in the matter of comparing numbers. The research was carried out in November 2022 with the research subjects being class II students, totaling 23 students, consisting of 16 male students and 7 female students. This study uses the Classroom Action Research method with the Stephen Kemmis and Robyn McTaggart models with two cycles, each cycle consisting of four stages, namely: planning, action, observation, and reflection. The pre-cycle percentage based on the results of the conceptual understanding assessment was 52% of students whose scores were above the minimum completeness criteria (KKM), then in cycle I it increased to 74% of students whose scores were above the KKM, and in cycle II it also increased to 96%. . These data indicate that using the Discovery Learning model can improve students' understanding of mathematical concepts in the mathematics subject matter of comparing numbers.

**Keywords:** Understanding of mathematical concepts, Discovery Learning models, classroom action research.

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**INTRODUCTION**

Comprehension has the same meaning with the word *understanding* (Sumarmo (in Een Unaenah: 2019). The degree of understanding is determined by the degree of relatedness of an idea, procedure or mathematical fact which is understood as a whole if these things form a network with high interrelationships. The concept is defined as an abstract idea that can be used to classify a set of objects (Depdiknas, 2003: 18). According to Duffin & Simpson (in Een Unaenah: 2019) conceptual understanding is the student's ability to: (1) explain concepts meaning that students are able to re-express what has been communicated to them, (2) use the concept in a variety of different situations, (3) develop some consequences of the existence of a concept, it can be

interpreted that students understand a concept as a result students have the ability to solve each problem correctly.

Hendriana, Rohaeti and Sumarno (2017) argued that mathematical understanding is a basic competence in mathematics which includes; the ability to absorb a material, remember mathematical formulas and concepts and apply them in simple cases or in similar cases, estimate the truth of a statement, and apply formulas in problem solving theorem.

Students are said to have the ability to understand mathematical concepts if students have fulfilled the predetermined indicators. In this case, that their knowledge value must meet the minimum completeness criteria (KKM) been determined, which is 65. Based on the their knowledge value in the matter of comparing numbers, 11 out of 23 of them were found to have scores below the KKM. This shows that their mathematical concepts are quite low. There are several identified problems causing low mathematical concepts, one of which is the implementation of the learning process carried out by the teacher still using conventional learning models, so students are less active in learning activities which causes a lack of their understanding and low knowledge scores. The concept of understanding mathematics is still in the low category, this can be seen from the daily assessment as follows:

Table 1. Second Graders' Knowledge Score on Comparing Numbers Materials (Pre-Cycle)

No	Name	Score	Description	
			Graduate	Passed
1	AM	60		√
2	AL	80	√	
3	AUA	60		√
4	AYH	60		√
5	DF	80	√	
6	DI	80	√	
7	FK	70	√	
8	FN	80	√	
9	FH	60		√
10	FZ	60		√
11	HA	60		√
12	KH	80	√	
13	MA	60		√
14	MNO	60		√

No	Name	Score	Description	
			Graduate	Passed
15	MNF	70	√	
16	MRH	60		√
17	MIH	60		√
18	MPA	50		√
19	NB	70	√	
20	NS	80	√	
21	RF	80	√	
22	RN	80	√	
23	SR	70	√	
Mean Score		68	12	11

To overcome the problem of the low students' understanding of concepts, the solution is to use the Discovery Learning (DL) model. Sibuea (2019) suggested that DL is learning method involving all students in the process of mental activity with opinions through discussion, then reads independently and tries it for them; then, they can do their own learning. According to Sinambela (2017) the steps for implementing DL are:

1. *Stimulation* (providing stimulation). The students are given problems at the beginning, so that they are confused which then create a desire to investigate this matter. At that time the teacher acted as a facilitator by providing questions, directions for reading texts, and learning activities related to discovery
2. The problem statement (identification of the problem). The second stage of this learning is that the teacher gives students the opportunity to identify as many incidents of problems that are relevant to the subject matter, then one of them is selected and formulated in the form of a hypothesis (temporary answer to the problem question).
3. Data collection, serves to prove related to existing statements so that students have the opportunity to collect various appropriate information, read appropriate learning resources, observe objects related to problems, interview speakers related to problems, conduct independent trials.
4. Data processing is an activity of processing data and information previously obtained by students. All the information obtained is all processed at a certain level of confidence.

5. Verification, which is an activity to prove whether or not a pre-existing statement is correct or not, which is already known, and is linked to the results of existing data.
6. Generalization (drawing conclusions/generalizations). This stage is drawing conclusions where the process draws a conclusion that will be used as a general principle for all the same problems.

The advantages of the discovery learning model are as follows: a) Helping students to improve and enhance cognitive skills and processes, b) Allowing them to develop quickly and at their own pace, c) Increasing the level of respect for them, because of the elements discussing, d) Being able to generate feelings of joy and happiness because students have succeeded in doing research, and e) Helping them eliminate skepticism (doubt) because it leads to a final and certain or definite truth.

Meanwhile the drawbacks according to the Ministry of Education and Culture (2013) are (1) this model raises the assumption that there is a readiness of the mind to learn. For students who lack low cognitive abilities will have difficulty in thinking abstractly or expressing relationships between concepts, written or spoken, which in turn will cause frustration. (2) This model is not efficient enough to be used in teaching a large number of students because it takes quite a long time to find problem solving activities. (3) Expectations in this model can be disrupted if students and teachers are used to the old way. (4) This discovery teaching model will be more suitable in developing understanding, but other aspects receive less attention.

Based on statements regarding the low understanding of mathematical concepts in grade II students in the matter of comparing numbers and regarding the learning model that is considered appropriate, namely the Discovery Learning model, this research examines more broadly *the Application of the Discovery Learning Model to Improve the Second Graders' Mathematical Concepts Understanding On Material Comparing Numbers at SDN Balagedog III*.

### **METHODS**

This research was carried out using the type of Classroom Action Research (CAR). Wardani (2004: 14) argued that it is a research conducted by teachers in their own classes through self-reflection, with the aim of improving their performance as teachers, so that student learning outcomes increase. The CAR used is the Stephen Kemmis and

Robyn McTaggart model. According to Kemmis and Mc Taggart (in Yudha 2017) CAR is a form of strategy in detecting and solving problems faced by educators with concrete actions, namely through research procedures in the form of cycles (recycling). This model consists of four stages, namely: planning, action, observation, and reflection.

### 1. Planning Stage

At this stage, the researcher plans activities, determines the time and method of presentation, determines alternative actions that can be taken, prepares tools and technical data analysis.

### 2. Action

Action is the implementation stage of planning, at this stage, the researcher carries out the planned actions.

### 3. Observation

This stage is carried out simultaneously with the action. The researcher takes action while observing what is happening.

### 4. Reflection

At this stage the researcher analyzes the data to determine whether the goals and results of the actions have been achieved or not.

This research was conducted in two cycles, one cycle consisting of 2 meetings. This research was conducted at SDN Balagedog III in the odd semester of the 2022-2023 academic year. The subjects in this study were all second grade students at SDN Balagedog III, totaling 23 students consisting of 16 male students and 7 female students. Research activities are carried out based on predetermined action plans, namely learning is carried out in accordance with the Learning Implementation Plan (RPP) that has been made, namely using the Discovery Learning model and to measure students' understanding of mathematical concepts using multiple choice test instruments that are developed according to conceptual understanding.

## RESULTS AND DISCUSSIONS

### Result

The results of class action research conducted in class II SDN Balagedog III are related to understanding mathematical concepts in the matter of comparing numbers

using the Discovery Learning model assisted by power point media. In table 2 is the pre-cycle data obtained.

Table 2. Data of Second Graders' Knowledge Score on Comparing Numbers Materials (Pre-Cycle)

No.	Learning Result	Score
1	High score	80
2	Lowest score	50
3	Mean score	68
4	Mastery learning	52%

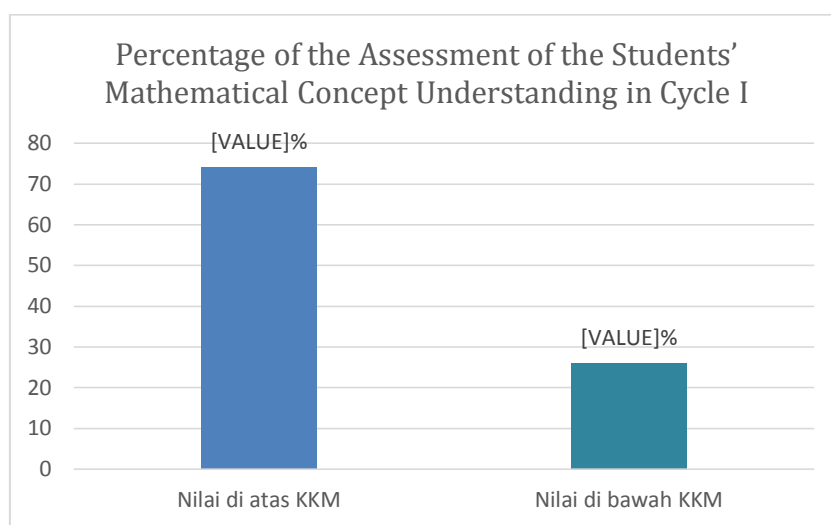
The students' understanding of mathematical concepts as seen from the value of knowledge that has been carried out at SDN Balagedog III shows pre-cycle results with their highest score of 80 and the lowest score of 50 with an average of 68 and completeness of 52%. Then, the learning improvement was carried out using the Discovery Learning model whose results showed an increase in students' understanding of mathematical concepts in cycle I.

Table 3. The Score of the Students' Mathematical Concept Understanding in Cycle I

No	Name	Score	Description	
			Graduate	Passed
1	AM	60		√
2	AL	90	√	
3	AUA	90	√	
4	AYH	60		√
5	DF	90	√	
6	DI	90	√	
7	FK	80	√	
8	FN	90	√	
9	FH	60		√
10	FZ	90	√	
11	HA	90	√	
12	KH	80	√	
13	MA	80	√	
14	MNO	60		√
15	MNF	90	√	
16	MRH	90	√	
17	MIH	70	√	
18	MPA	60		√
19	NB	90	√	
20	NS	90	√	
21	RF	90	√	
22	RN	80	√	
23	SR	90	√	

Mean Score	81	17	6
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Increased understanding of learning concepts seen by the value of students' knowledge before and after learning using the Discovery Learning model. The highest value increased, in the pre-cycle 80 then in the first cycle it became 90, the lowest value in the pre-cycle was 50 then in the first cycle it became 60, the increase also occurred in the average value which was in the pre-cycle 68 then in the first cycle 81, and mastery minimum also increased from pre-cycle 52% to 74%. The following is a graph of the percentage results of the assessment of students' understanding of mathematical concepts in cycle I.



Graph 1. The Result Percentage of the Assessment of the Students' Mathematical Concept Understanding in Cycle I

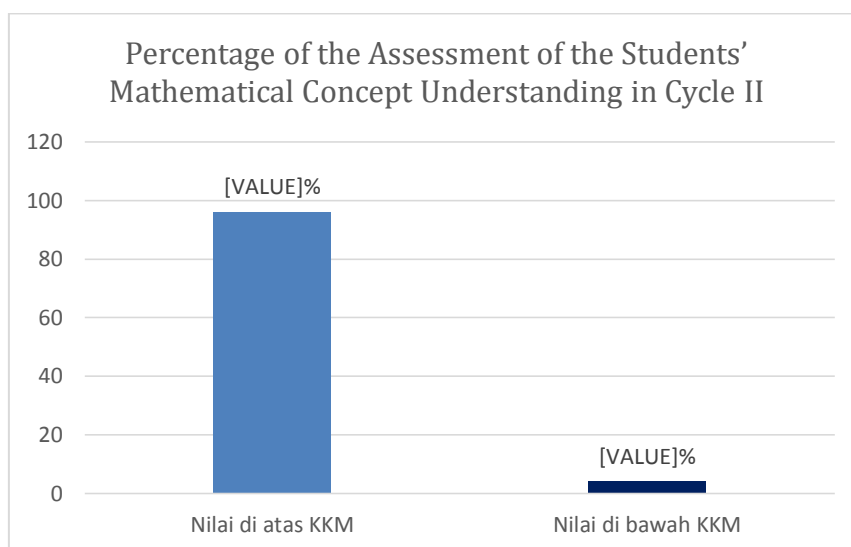
Based on the percentage graph above, it can be concluded that as many as 74% of students scored above the KKM and 26% of the students scored below the KKM, so the research was continued in cycle II.

Table 4. The Score of the Students' Mathematical Concept Understanding in Cycle II

No	Name	Score	Description	
			Graduate	Passed
1	Am	70	√	
2	Al	100	√	
3	Aua	90	√	
4	AYH	70	√	
5	DF	100	√	
6	DI	100	√	
7	FK	90	√	

No	Name	Score	Description	
			Graduate	Passed
8	FN	90	√	
9	FH	70	√	
10	FZ	90	√	
11	HA	90	√	
12	KH	100	√	
13	MA	80	√	
14	MNO	70	√	
15	MNF	90	√	
16	MRH	90	√	
17	MIH	70	√	
18	MPA	60		√
19	NB	90	√	
20	NS	100	√	
21	RF	100	√	
22	RN	80	√	
23	SR	90	√	
Mean score		86	22	1

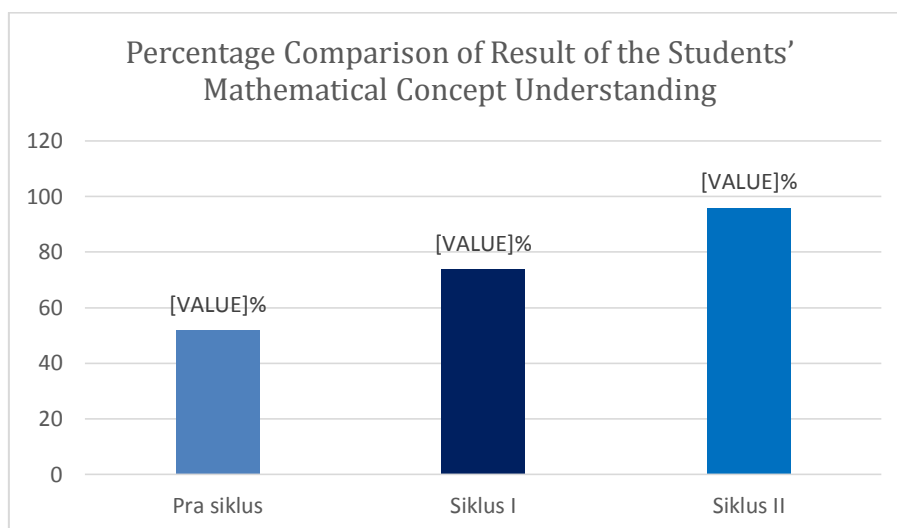
The increase in understanding of learning concepts was seen by the value of students' understanding in cycle I and cycle II using the Discovery Learning model. The highest score increased, in the first cycle it was 90 then in the second cycle it became 100, the average value in the first cycle was 81 then in the second cycle it was 86, and the minimum completeness also increased from the first cycle by 74% to 96%. The following is a graph of the percentage results of the assessment of students' understanding of mathematical concepts in cycle II.





Graph 2. The Result Percentage of the Assessment of the Students' Mathematical Concept Understanding in Cycle II

Based on the percentage chart above, it can be concluded that 96% of students scored above the KKM and 4% of students scored below the KKM. So it can be concluded that in each cycle there is an increase in the value of understanding mathematical concepts with the following comparison



Graph 3. The Percentage Comparison of Result of the Students' Mathematical Concept Understanding

## Discussion

Based on the research results, it was found that there was an increase in students' understanding of mathematical concepts after the Discovery Learning model was applied. The results of the understanding scores from cycle I and cycle II showed an increase in the ability to understand mathematical concepts for class II students at SDN Balagedog III. This can be seen from the students' mastery which increased in each cycle, the increase from pre-cycle to cycle I and from cycle I to cycle II both experienced an increase of 22%. In the pre-cycle the average score of students' understanding also increased, from the pre-cycle of 68 then after learning using the Discovery Learning model in the first cycle it increased to 81, and in the second cycle it increased to 86.

The students' mastery learning outcomes from the pre-cycle, cycle I and cycle II also showed an increase. Those who completed the KKM (65) in the pre-cycle were 12 students or 52% and 48% did not complete the KKM. Then learning using the Discovery Learning model in cycle I saw an increase, the students who completed the KKM were

17 students or as much as 80% and those who did not complete the KKM were 6 students or as much as 26%. In contrast to cycle II, students who completed the KKM were 22 students or 96% and 1 student or 4% did not complete.

Based on the research data it is known that the implementation of learning mathematics in the matter of comparing numbers using the Discovery Learning model has increased, but this increase has not yet reached the target of increasing that has been set, namely 75% of students' understanding scores above the KKM. Therefore, reflection was carried out on the implementation of cycle I. Based on reflections on cycle I, the failure to increase was caused by not implementing learning optimally. In cycle I each student is divided into groups, each group consisting of 4-5 students to complete the student worksheets related to comparing numbers using symbols  $<$ ,  $>$ , and  $=$ . The number of students in the group causes students to be engrossed in chatting, there are only 1-2 students in the group who do the work, the others don't do the work. In addition, students are still not used to learning using the Discovery Learning model. Based on the reflection results from cycle I, the number of students in each group was reduced to 2-3 students. As a result, students become more focused on completing assignments and can increase student learning activities so that students better understand material comparing numbers. This can increase the target level of minimum completeness that is expected to be 75% to 96%.

Based on the reflection results from cycle I, the number of students in each group was reduced to 2-3 students. As a result, students become more focused on completing assignments and can increase student learning activities so that students better understand material comparing numbers. This can increase the target level of minimum completeness that is expected to be 75% to 96%.

Increasing students' understanding of mathematical concepts using the Discovery Learning model is in line with research that has been conducted by Sadyah (2021) which shows learning outcomes using the Discovery Learning model in the concept of multiplication and division can improve student learning outcomes for class II SDN Cijakan2, it is proven that there is an increase in the percentage of results learning from cycle I by 75% to 100% in cycle II, or an increase of 25%. Learning using the Discovery Learning model on the concept of multiplication and division can increase the learning activities of class II students at SDN Cijakan 2, and student responses to learning using

the Discovery Learning model regarding the concept of multiplication and division in problem solving for class II students at SDN Cijakan 2 are positive.

Research conducted by Nike and Siwi (2019) is also similar, based on the results of the discussion and data analysis, it can be concluded that there is a significant influence between the application of the Discovery Learning model and the conventional model on student learning outcomes in class IV Mathematics at SD Negeri Brosot Academic Year 2019/2020.

### CONCLUSION

From this study, it can be concluded that the students' understanding of mathematical concepts in class II at SDN Balagedog III can be increased by applying the Discovery Learning model. The Discovery Learning model can improve students' understanding of mathematical concepts in the matter of comparing numbers, this can be seen from the percentage value of student completeness which continues to increase from the pre-cycle where student completeness only reaches 52%, then in cycle I it reaches 74%, and in cycle II it reaches 96%. Learning using the Discovery Learning model regarding material comparing numbers can increase the learning activities of class II students at SDN Balagedog III.

### ACKNOWLEDGMENTS

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### REFERENCES

- Ana, N. Y. (2018). Penggunaan model pembelajaran *discovery learning* dalam peningkatan hasil belajar siswa di sekolah dasar. *Jurnal Imiah Pendidikan dan Pembelajaran*, 2(1).
- Karlina, L., & Anugraheni, I. (2021). Meta analisis model *discovery learning* untuk meningkatkan hasil belajar matematika siswa SD. *JPMI (Jurnal Pendidikan Matematika Indonesia)*, 6(1), 35-43.
- Prasasty, N., & Utaminingtyas, S. (2020). Penerapan model *discovery learning* pada pembelajaran matematika siswa sekolah dasar. *Jurnal Riset Pendidikan Dasar (JRPD)*, 1(1), 57-64.

- Prihantoro, A., & Hidayat, F. (2019). Melakukan penelitian tindakan kelas. *Ulumuddin: Jurnal Ilmu-ilmu Keislaman*, 9(1), 49-60.
- Sadyah, S. (2021). Upaya Meningkatkan hasil belajar siswa pada mata pelajaran matematika tentang perkalian dan pembagian melalui model Discovery Learning di kelas II SDN Cijakan 2. *MENDIDIK: Jurnal Kajian Pendidikan Dan Pengajaran*, 7(1), 90-93.
- Safitri, W. C. D., & Mediatati, N. (2021). Penerapan model discovery learning dalam pembelajaran ipa untuk meningkatkan kemampuan berpikir kritis dan hasil belajar siswa sekolah dasar. *Jurnal Basicedu*, 5(3), 1321-1328.
- Sarwoedi, S., Marinka, D. O., Febriani, P., & Wirne, I. N. (2018). Efektifitas etnomatematika dalam meningkatkan kemampuan pemahaman matematika siswa. *Jurnal Pendidikan Matematika Raflesia*, 3(2), 171-176.
- Surya, Y. F. (2017). Penerapan model pembelajaran problem based learning untuk meningkatkan hasil belajar matematika siswa kelas IV SDN 016 Langgini Kabupaten Kampar. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 1(1), 38-53.
- Unaenah, E., & Sumantri, M. S. (2019). Analisis pemahaman konsep matematis siswa kelas 5 sekolah dasar pada materi pecahan. *Jurnal Basicedu*, 3(1), 106-111.
- Yudha, A. N. (2017). Peningkatan hasil belajar matematika melalui discovery learning berbantuan talking stick siswa kelas 2 SD. *JURNAL HANDAYANI PGSD FIP UNIMED*, 7(2), 142-152.