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IMPROVING UNDERSTANDING OF THE CONCEPT OF FLAT SHAPES THROUGH CONCRETE REPRESENTATIONAL ABSTRACT (CRA) STRATEGY FOR STUDENTS WITH MILDLY INTELECTUAL DISABILITY CLASS IV SDLB AT SLB NEGERI PEMBINA YOGYAKARTA

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ABSTRACT

This study aims to apply the Concrete Representational Abstract (CRA) strategy in learning mathematics about flat shapes; namely the concept and shape of a square, rectangle and circle for mildly disabled students. Because flat shapes are objects that learners often find in everyday life. The subjects of the study were 2 female and 1 male mildly intellectual disability in class IV-A. The method used is Classroom Action Research (PTK) which aims to improve and improve the quality of learning through several actions, identification, planning, implementation, and reflection. The results showed that after this research was carried out there was an increase in the understanding and learning outcomes of students, this can be seen from the average test scores obtained by students increased in each cycle. The average pre-test score was 63, the first cycle was 83, the second cycle was 83, and the post-test was 87, meaning that there was a significant increase from the pre-test score of 63 to the post-test score of 87, with a steady increase after the first cycle. Thus, the use of the CRA strategy can improve the learning outcomes of students in class IV-A SLB Negeri Pembina Yogyakarta in mathematics. Class mastery and the application of the CRA strategy in teaching and learning activities are important factors in the success of learning.

Keywords: *Concrete Representational Abstract (CRA), intellectual disability, flat shapes.*

INTRODUCTION

Special education is a form of education service that focuses on handling children with special needs (ABK), one of which is children with intellectual disabilities or mild intellectual disability (Sumarni, 2019). This term can be interpreted as those who have conditions and intelligence functions below the average child in general, with marked adaptive abilities and behaviors that occur during the developmental period up to the age of 18 years (Widiastuti & Winaya, 2019). The linguistic, logical-mathematical, musical, naural, intrapersonal, and interpersonal abilities of children with intellectual disability are not as good as those of other children (Kusuma, 2019). Special education services are needed consistently and continuously to improve the quality of education for them as well as possible (Ulva & Amalia, 2020).

A branch of science that is important for everyone to learn, including those with special needs, is mathematics (Nurhayati, 2020). Learning mathematics is not limited to school benches, it can be contextually implemented in daily life practices (Sakiinatullaila et al., 2020). Targeted methods and approaches are needed by every teacher and parent to teach these skills to children with disabilities from an early age according to their characteristics (Nurfaidah et al., 2020).

The quality of mathematics learning has gone through many reforms in the curriculum, teaching system, teacher quality, and so on. This renewal can be realized in several ways, one of which is by creating a good learning atmosphere, choosing the right learning strategies and approaches, knowing students' learning habits and pleasures so that they are passionate and maximize their full potential during the learning process (Ariyanti et al., 2021). Teachers are required to explore and confirm conditions that can improve the quality of learning in Sekolah Luar Biasa (SLB) (Nofita et al., 2022).

The role of the right learning strategy is an important point in the learning process of children with intellectual disabilities. Teachers are required to design learning concepts that are interesting, interactive, and provide meaning construction for students (Sutarman, 2024). Meaningfulness includes understanding the concept of learning through direct and real experiences. This has adopted the principles of learning for children with intellectual disabilities, namely functional, contextual, sustainable and behaviorism (Aini, 2022).

Flat shapes are part of the basic math curriculum at the primary and secondary school levels. Concepts such as length, width, height, angle, perimeter, and area are fundamental elements in geometry. (Rahmadani & Wandini, 2023) Understanding the concept of flat shapes in the educational aspect is very important because it provides a strong foundation for various disciplines and critical thinking skills. Understanding the properties and characteristics of flat shapes helps

learners develop logical and analytical thinking skills. They learn how to recognize patterns, make connections between concepts, and solve problems with a systematic approach. (Arifin et al., 2019).

Based on the problems found in the field, students with mild intellectual disability in class IV-A SLB Negeri Pembina Yogyakarta have difficulty in understanding the concept of flat shapes; square, rectangle, and circle. The difficulties in question are as follows, 1) Difficulty in distinguishing abstract and semi-concrete shapes of squares, rectangles, and circles, students tend to represent these shapes in a 3-dimensional form. Like squares and rectangles are squares, and circles are round (misconception). 2) Learners are often wrong in choosing the pictures and objects of square, rectangle, and circle shapes mentioned by the teacher. 3) Learners are often wrong in classifying square, rectangle, and circle shapes as instructed by the teacher. 4) Learners tend to guess in matching the names and shapes of square, rectangle, and circle shapes. 5) Learners are not yet fluent in writing the names of square, rectangle, and circle shapes. Learners often confuse the letter p with q, the letter g with the number 9, and the letter s with the number 2. Learners find it difficult to write words with combined letters n and g, such as rectangle. 6) Learners are not yet fluent in drawing square, rectangle, and circle shapes without the help of dotted line patterns. 7) Teachers have not paid attention to the stages of learning in accordance with the category of intellectual disability that students have. 8) Learning strategies and approaches carried out by teachers are only limited to providing knowledge and skills, not providing contextual meaning for students.

The problem of recognizing the shapes of square, rectangular, and circular shapes in mildly intellectually disabled children before writing names and drawing shapes is to first demonstrate concretely through real objects that have the same form as the flat shapes (Khaerunnisa et al., 2020). Then proceed to semi-concrete or representation of flat shapes through pictures, and abstracting flat shapes through notations or dotted lines (Ginting, 2019). Therefore, one of the learning strategies needed to provide an understanding of the concept of shape directly and gradually is the Concrete Representational Abstract (CRA) strategy.

The CRA strategy can help learners understand the concept and shape of flat shapes holistically and dynamically (Ahmad, N., & Mansor, 2019). This strategy is considered appropriate for delivering material that is abstractional in nature, which begins by explaining the 3-dimensional to 2-dimensional form of flat shapes. The stages of implementing learning through CRA (Memen Permata Azmi, 2019) carried out by teachers and students are, 1) Learning the concrete concepts of square, rectangle, and circle shapes through real objects and multimedia, 2) Learning the concept of representation of square, rectangle, and circle through pictures, 3) Learning the abstract concept of

square, rectangle, and circle through abstract notation in the form of a combination of points and lines.

Using real or concrete objects and connecting them with image representations will help learners gain additional access to ideas when having difficulty learning abstract shapes (Efendi, 2019). The strategy is carried out in stages so that mastery of the concepts of square, rectangle, and circle shapes can be understood by students so that the desired learning objectives can be achieved optimally. Through the CRA strategy approach, it is expected to be able to create renewal of implementation and improve learning outcomes on the concept of flat shapes, because the CRA steps are in accordance with the principles of learning for mildly intellecual disability students.

METHOD

This research is a class action research (PTK) conducted at SLB Negeri Pembina Yogyakarta. The subject of this research is Phase B IV-A class students with mild itellectual disability category semester 2. The number of students is 3 people, with 2 female students, and 1 male student.

The data came from the pre-test and post-test results of class IV-A students and interviews with class IV-A teachers. The data collection techniques applied and the objects studied are observation of the characteristics and learning styles of students, interviews with class teachers, and tests or assignments before and after the learning cycle (Purwanto, 2021). Data analysis techniques in this study are data reduction, data presentation, and conclusion drawing (Strickland & Maccini, 2019). This research was conducted over 2 cycles, consisting of two meetings per cycle. (Strickland & Maccini, 2019) stated that PTK is a research procedure consisting of four stages, namely planning, implementation (action), observation and reflection. The implementation of the cycle in this PTK can be seen in the following flow chart (Miryani, 2019):

Picture Source: Arikunto's PTK Book
Picture 1. Classroom Action Research Cycle.

Based on the flow chart above, the Cycle 1 research procedure consists of:

1. Planning stage; the teacher prepares teaching modules, completes media and learning tools, grids of exercise questions, evaluation tools, observation sheets, and so on.
2. Implementation Stage; during the learning action, the teacher used the Concrete Representational Abstract (CRA) strategy and approach.
3. Observation Stage; observation of students' activities while participating in teaching and learning activities which consist of observing behavior, ways and learning styles.
4. Reflection Stage; reflection is a stage carried out by researchers together with collaborators, with the aim of discussing the results of actions, shortcomings and advantages in each cycle, improvements in each meeting, and analyzing the results of the study.

The research stages in Cycle 2 consisted of:

1. Planning Stage; the teacher prepares alternative problem solving, teaching modules, varying media and learning tools, grids of exercise questions, evaluation tools, observation sheets, and so on for learning or Cycle 2.
2. Implementation Stage; during the learning action, the teacher uses the Concrete Representational Abstract (CRA) strategy and approach according to the previous scenario.
3. Observation Stage; observation of students' activities during teaching and learning activities consisting of observing behavior, ways and learning styles compared to previous learning.
4. Reflection Stage; reflection is a stage carried out by researchers together with collaborators, with the aim of discussing the results of actions, shortcomings and advantages in each cycle, improvements in each meeting, analyzing research results, seeing learning achievements, and seeing changes in student learning.
5. Conclusion; presents data on the results of actions from each cycle accumulated in the form of numbers (percentage) and descriptions.

RESULTS AND DISCUSSION

The results of the pre-test conducted by researchers on class IV-A students at SLB Negeri Pembina Yogyakarta on May 2, 2023 there were students with scores still below the Criteria for Achieving Learning Objectives (KKTP), namely 30. The score is still classified as low because it has not reached KKTP, which is 65. Data from 3 students, consisting of 2 female students and 1 male student, there is still 1 student who has not been completed, while other students have obtained

scores above KKTP. The ratio between learners who have not completed and those who have completed is 1:2. While the percentage of students who are complete is only 66% of 3 participants, and 33% of 3 students have not reached the minimum completion value.

Referring to the pre-test results above, it is known that the low thinking ability of children with disabilities is a challenge for teachers to provide an understanding of the concept of flat shapes (Cheng, 2021). The selection of learning approaches and strategies is not in accordance with the principles of learning mathematics for people with disabilities, starting from the introduction of concrete, semi-concrete, and abstract shapes (Schnepel & Aunio, 2022). Efforts to renew learning strategies are needed to help students recognize and understand the concept of square, rectangular, and circular shapes in order to clarify learning materials and improve student learning outcomes (Fauzi, 2021).

Through the implementation of the CRA strategy stages, students are guided to better recognize and understand the shapes of square, rectangle, and circle shapes. The stages of CRA that have been applied in this study are as follows (Hidayat, 2020);

1. Concrete stage; the teacher prepares the media and explains the material of flat shapes, students make observations and identify real objects in the form of flat shapes from the teacher's media and objects in the classroom (Devi, 2020).
2. Representation stage, after going through the concrete stage, students with teacher guidance continue identification at the image or semi-concrete representation stage by observing the shapes of flat shapes in the picture presented by the teacher (Budiarti, 2020).
3. Abstract stage, learners conduct systematic analysis of flat shapes through abstract notations in the form of points and lines presented by the teacher (Musthofa, 2019).

At all these stages, the teacher plays a very important role in guiding students, explaining in detail and in depth (Arrum, 2021). Teachers prioritize learning principles for mild disabilities (Nurhanifa, 2021). Furthermore, as a form of practice and evaluation, the teacher provides worksheets for students to assess the extent to which students understand the concept of flat shapes (Prasetyo et al., 2020).

The results of the implementation of learning in specific learners (Strickland & Maccini, 2019), namely;

1. Improve learning outcomes in recognizing and understanding the concept of square, rectangle, and circle shapes (Almanawara & Fatmawati, 2021).
2. Reducing to eliminating misconceptions on the shapes of square, rectangle, and circle shapes that are usually associated with a 3-dimensional form.
3. Improving the learning methods carried out by teachers both gradually and continuously.

This can be seen from the level of ability of students based on the results of the reflection of each cycle;

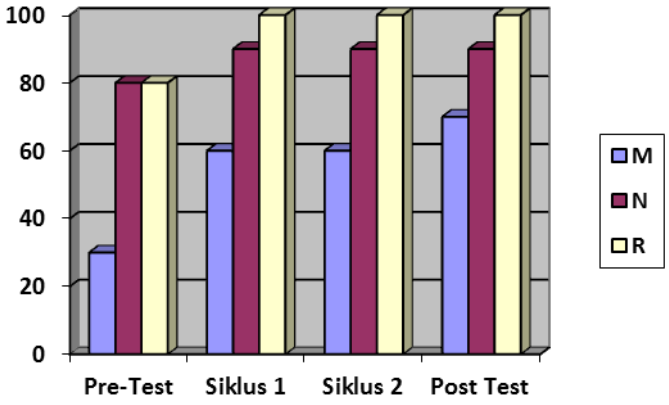
1. Pre-Test; the teacher gets the initial value and ability of students' understanding of the concept of flat shapes. There are learners with scores below KKTP, with a completeness ratio of only 1: 2. As a solution, the teacher takes action in cycle 1 by applying the CRA strategy.
2. Cycle 1; the value has not yet reached a significant increase from the pre-test results. The obstacles faced by the teacher were not mastering the condition of the students at that time. The 2-way communication built by the teacher has not been able to master students. The media and teaching aids used tend to be easy to find and not interesting for students. Guidance for students who are still less capable has not been carried out by the teacher optimally. However, the evaluation scores have increased from the pre-test at the beginning.
3. Cycle 2; improvements have begun to be seen in terms of learning media, teacher interaction with learners, when implementing learning evaluations the teacher has guided learners who need it evenly. Teachers provide prompts to learners according to their needs at that time. However, there are still learners who are confused and mistaken when writing the names of flat shapes on evaluation questions. However, the evaluation scores have improved from the previous cycle. There are still learners who say a circle is round, and a rectangle is a box (3D).
4. Post Test; as a final assessment the teacher gives a time span or pause for some time as a form of significance of cycle 2 learning outcomes. Learners have improved their understanding of flat shapes. They do not need the help of concrete objects, just from the representation of images and the help of dotted line notation. In terms of scores, each learner has passed the KKM, meaning that all get a complete score.

Specific improvement in cognitive aspects in understanding the shape and concept of square, rectangular, and circular shapes through the CRA strategy, based on the results of data processing and analysis has not reached 100%, but there is an increase in the test results of students in each action cycle. This phase of change has illustrated that the CRA stage can improve the ability of mildly retarded learners in class IV-A SLB Negeri Pembina Yogyakarta in understanding the concepts and shapes of squares, rectangles, and circles, and eliminate the misconceptions of mentioning the names of the flat shapes above. The improvement in the ability of students can be seen from the analysis of graph 1 that;

1. The Initial Condition (pre-test) on the concepts and shapes of square, rectangle, and circle reached 63%.

2. Cycle 1 phase on the concepts and shapes of square, rectangle, and circle reached 83%.
3. Cycle 2 phase on the concepts and shapes of square, rectangle, and circle reached 83% (constant).
4. The Final Condition (post test) on the concepts and shapes of square, rectangle, and circle reached 87% (increasing).

Starting from the results achieved by students who have reached KKM 65 in accordance with the standards made by the teacher and based on the analysis obtained from the test results of students in each cycle using CRA, it can be stated that there has been an increase in the ability of mildly intellectual disability students in class IV-A in understanding shapes, distinguishing shapes, classifying shapes, writing names, and drawing square, rectangular, and circular shapes at SLB Negeri Pembina Yogyakarta.



Graph 1. Improved understanding of the material

	Pre-Test	Cycle 1	Cycle 2	*Post-Test*
N	30	60	60	70
M	80	90	90	90
R	80	100	100	100
Max. Score	63%	83%	83%	87%

Table 1. Improvement of Material Understanding

Based on the table and graph of the increase in material understanding above, the use of the CRA strategy has a significant impact on improving the ability of mildly intellectual disability students in class IV-A SLB Negeri Pembina Yogyakarta to understand the concepts and shapes of square, rectangular, and circular shapes.

The test data shows an increase in scores from pre-test to post-test in several cycles. The following is the analysis:

1. Pre-Test Mean Score (63):

This is the initial mean score before any particular intervention or treatment.

2. First Cycle (83):

   After the first intervention, the mean score increased to 83. This shows a significant improvement from the pre-test.

3. Second Cycle (83):

   In the second cycle, the mean score remained at 83, indicating that there was no increase or decrease from the first cycle.

4. Post-Test (87):

   After the entire cycle was completed and the post-test was conducted, the average score increased again to 87. This shows that overall, the intervention or treatment had a positive effect on the score improvement.

There was a significant increase from the pre-test score (63) to the post-test score (87), with steady improvement after the first cycle. The second cycle showed no change in mean scores, which may indicate that most of the improvement was already achieved in the first cycle. The higher post-test results indicate the effectiveness of the intervention in improving test takers' performance.

CONCLUSIONS AND RECOMMENDATIONS

Referring to the introduction, the results of data analysis and discussion of the research that has been above, it can be concluded that the understanding of the concepts and shapes of square, rectangular, and circular shapes of students with mild intellectual disabilities in class IV-A SLB Negeri Pembina Yogyakarta who are taught through the CRA strategy is better than the learning strategy used by the teacher before (conventional lecture).

The suggestions conveyed based on the results of the research that has been done are to other interested researchers, it is recommended to conduct research on the CRA strategy with a larger population and broader learning materials to determine the effect of the application of the CRA strategy in learning mathematics in more depth.

Furthermore, for mathematics education practitioners, especially classroom teachers and mathematics teachers are expected in classroom learning to apply the CRA strategy as one of the learning alternatives considering the positive effect this model has on students' mathematical communication skills.

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