

## My 4 in 1 Math Plate

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**Abstract:** Counting is a critical skill in human life. Even if they already recognize numbers, Special Education students with learning disabilities typically struggle with mastering addition, subtraction, multiplication, and division skills. The primary reason for this is that they recognize numbers solely on the basis of their appearance, and some of these students simply memorize. Thus, we developed an innovation using the 'My 4 in 1 Math Plate' tool to assist Special Education students in developing their ability to perform addition, subtraction, multiplication, and division operations. Initially, this study enrolled five (5) Special Education students from PPKI Bestari and two (2) Special Education students from PPKI Perkasa in SJKC Sin Min's Special Education Integration Program. This study was conducted using an action research design. The data were analyzed descriptively using observations, video recordings, interviews, photographs, and checklists. The study's findings indicate this tool can assist Special Education students in developing their ability to perform addition, subtraction, and division operations. Using this tool also helps teachers in planning and implementing student-centered (PdPc) activities. Additionally, this study can serve as a substitute for the counting method, with a 100% accuracy rate compared to the conventional counting method.

**Keywords:** Special Education, Learning Disability

### 1. Introduction

'My 4 in 1 Math Plate' was created in response to the difficulty of instructing Special Education students with learning disabilities in the process of adding, subtracting, multiplying, and dividing. While most of them understand numbers, they cannot apply them to addition, subtraction, multiplication, or division processes. Additionally, some students can count but are unable to distinguish numbers. After determining that most Special Education students at SJKC Sin Min fall into the Autism and Attention Deficit Hyperactivity Disorder (ADHD) categories, we decided that standard teaching approaches are ineffective, such as using fingers, sticks and even abacus, as Autism individuals require a unique

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learning environment [1]. These Autistic students' neurological abnormalities cause them to focus attention for barely five minutes, but they like repeated patterns and activities [2]. To ensure success in teaching mathematics skills to students, particularly those with autism, learning needs to be more methodical and consider the qualities of mathematics that correspond to their talents [3]. As a result, we integrate the benefits of Autistic and ADHD students who value rotating objects, hands-on learning, logic, simple symbols, and enjoyment as vital features in 'My 4 in 1 Math Plate'.

## 2. Materials and Methods

'My 4 in 1 Math Plate' was created utilizing existing and recycled materials and tools. The materials needed to develop this tool are a 10-inch plastic plate, a 4-inch paper plate, boxes, and stationery such as marker pens, rulers, stickers, and thumbtack. Figure 1 shows 'My 4 in 1 Math Plate' as a tool.



Figure 1: My 4 in 1 Math Plate

The Kurt Lewin Model (1946) was used as a guide for conducting this study [4]. The action research cycle according to Lewin's model is depicted in Figure 2.

Identifying problems	•School students always make mistakes when solving basic maths
Action Planning	•Introducing the use of the 'My 4 in 1 Math Plate' tool
Implementation	•Perform actions according to plan and phase with the use of the 'My 4 in 1 Math Plate' tool
Observation	•Data collection process through observations, interviews and document analysis
Reflection	•Evaluate the effectiveness of the use of tools and make improvements

Figure 2: The action research cycle, according to Lewin's model (1946)

- Identifying problems- A unique checklist was developed to assess students' difficulties and their level of mastery and ability to perform four basic operations. Numerous issues were uncovered as a result of the checklist, including the following:
  - i. Stick method – when students count sticks, they usually count them incorrectly or excessively.
  - ii. Finger method - students are not adept at counting with their fingers and frequently count only the fingers on one hand. Additionally, it is difficult for students with psychomotor disabilities to use their fingers.
  - iii. Tools such as the abacus—too many beads and colours can confuse Autistic students, and certain colours can distract them.

- Action planning - 'My 4 in 1 Math Plate' was introduced based on sensory integration theory, which states that this tool can help students integrate their senses, particularly touch, proprioceptive, vestibular, and motor planning. Indirectly, these tools can provide stimulus from a variety of sensory inputs to develop cognitive abilities. Frequent use of this tool can also help students improve their basic mathematical operations more quickly and accurately.
- Implementation - The study phase for the usage of this innovative tool begins in January 2021 and ends in December 2021.
- Observation - The descriptive and quantitative data obtained during the investigation should be examined. During the intervention session's observation, a checklist was created to serve as one of the assessment tools. Video recordings will be utilized as proof and a point of reference to ensure that accurate data is obtained. Additionally, students interviews were done to have a better understanding of the treatments that were adopted. These interviews underwent a descriptive analysis. The results of student worksheets before and after using the 'My 4 in 1 Math Plate' tool were evaluated as quantitative data. Quantitative analysis was used to analyze the worksheet by placing an academic grade scale to assess and determine the student's achievement using the formula:

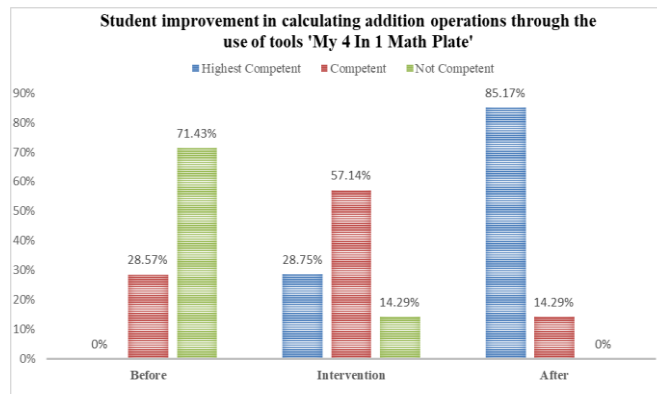
$$\text{Student Competent} = \frac{\text{Total number of questions answer correctly}}{\text{Total number of questions}} \times 100\%$$

The range for highest competent is 90 % above, competent is 70% to 89% and not competent below 69%.

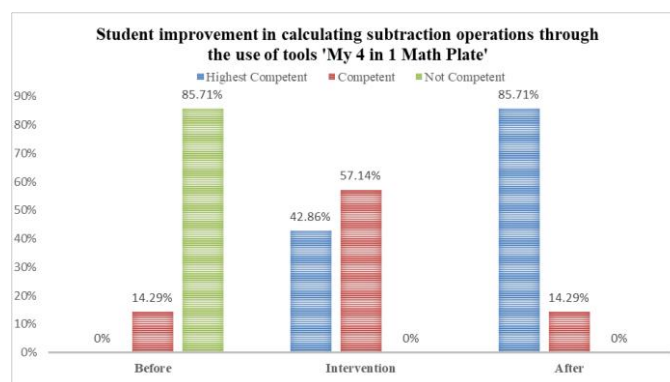
- Reflection - The finding of this study is contingent upon the thorough implementation of the intervention strategies that have been prepared to assist Special Education students in improving their counting skills. Fundamental mathematical knowledge and skills must be emphasized so that students can calculate and solve problems at a high level of thinking. Additionally, this study will also be used as a guide for other teachers to be used in intervention actions for future studies. Among the concerns and problems that this innovation can address:
  - i. Assists students' cognitive development by meeting their sensory integration demands.
  - ii. Eliminate student misunderstanding by implementing a more systematic and straightforward calculation system.
  - iii. Students who do not understand numbers can also answer questions about basic mathematical operations if they recognize the shape of numbers.
  - iv. Developing another alternative approach for students to practice their counting skills.

### 3. Results and Discussion

Worksheets are given to students in three phases; prior to the use of tools, during the intervention and after the use of tools. The findings of each phase are shown in Figure 3 (addition operation) and Figure 4 (subtraction operation).



**Figure 3: Student Improvement in calculating addition operations through the use of tools 'My 4 in 1 Math Plate.'**



**Figure 4: Student Improvement in calculating subtraction operations through the use of tools 'My 4 in 1 Math Plate.'**

The results and discussion section presents data and analysis of the study. This section can be organized based on the stated objectives, the chronological timeline, different case groupings, different experimental configurations, or any logical order as deemed appropriate.

#### 4. Conclusion

Based on the study conducted, it was found that Special Education students need a different approach in learning a skill to be applied. Therefore, a study needs to be done on the methods that can be used in the PdPc process. This study has a more easily understood approach, especially for performing addition, subtraction, multiplication and division operations. The application of various intervention methods can attract Special Education students' interest in other subjects. The experience gained in this study may also be used to improve good practice in other areas of PdPc.

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