

Math Strategy Notebooks and Executive Function

Background

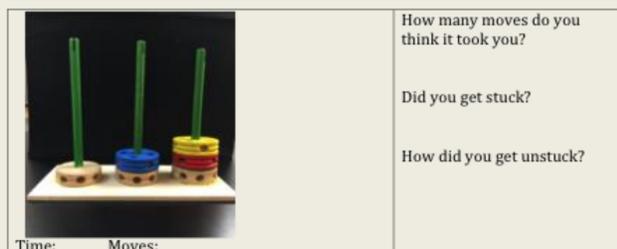
My research was conducted at Midtown International School in Atlanta, GA. I selected my topic after seeing many of my highly cognitive students struggle with the application of mathematical concepts. Their ability to understand and comprehend the concepts was sufficient, however, they lacked the capability to apply the math concept in problem-solving scenarios. The executive functions of working memory, cognitive flexibility, and inhibition are cognitive functions that enable a student to plan for and execute a task within a problem solving scenario (Roditi & Steinburg, 2007).

Treatment

The second grade math students (N=12) were given a notebook, and for each math concept explored, a minimum of different and then recorded. Additionally the student's preferred strategy was recorded with supporting reasoning and reflection analysis. The student kept the strategy notebook at their desk and used it when solving a math problem. Students were given explicit instruction when learning each strategy including recognizing when an additional strategy was needed (cognitive flexibility), inhibiting any unnecessary information or irrelevant strategies, and how to use the notebook to assist working memory.

Results

- After using the strategy notebook, student confidence levels, working memory, and inhibition did not increase.
- When taking the Tower of London Assessment, student speed decreased from pre-to post treatment.
- 77% of students utilized two or more strategies when solving a math problem in their notebook.



Task:	Example:
Addition within 100	21 + 18 =
Strategy 1:	Strategy 2: 100s Chart
Common	Place
Value	Value
20 + 1 =	21 + 18 =
10 + 8 =	

Focus Questions and Data Analysis

Will the use of math strategy notebooks specifically increase...	Data Source 1	Data Source 2	Data Source 3	Data Source 4
Working memory?	Verbal Number Set	Tower of London Assessment	Picture Span Test	Tower of London Questionnaire
Cognitive flexibility?	Tower of London Questionnaire	Tower of London assessment	Notebook Rubric	Confidence Survey for Inhibition
Inhibition?	Confidence Survey for Inhibition	Picture Span Test	Notebook Rubric	Verbal Number Set

Conclusion

Students did not improve in the executive functions of working memory and inhibition. However, the notebooks did increase the cognitive flexibility in students.