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Student Choice of Mathematics Strategies

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Research Question

- In what ways does providing student choice affect students' learning in mathematics?

Literature Review

- Structured supplementary intervention on addition strategies led to an increase in test scores and general addition knowledge (Baroody, Eiland, Purpura, & Reid, 2013).
- According to Torbeyns, Verschaffel, and Ghesquire (2006), students chose what strategy to use based off of classroom instruction and many solved problems as modeled by their teachers.
- The majority of students found visual strategies to be the most helpful when working independently (Maloy, Razzaq, & Edwards, 2014).
- Solving three-digit addition problems quickly and fluently by using mental addition strategies assisted students in finding the correct answer (Csíkos, 2016).
- Students were unable to fluently switch between different subtraction strategies in a single assessment, as they chose to only use a single strategy as demonstrated by their teacher (Peters et al., 2012).

Methodology

- Study involves 17 first grade students at suburban school with an 84% low income rate (Illinois Report Card, 2016).
- Students were taught how to use math manipulatives and other addition and subtraction strategies throughout the semester.
- Weekly student anecdotes, field notes, and student work were collected as data sources.
- Data was coded by looking at repetition, transitions, linguistic connections, theory related material, and missing data (Ryan & Bernard, 2008).

Figure 1. Students chose to use snap cubes to perform single digit addition. Most students preferred and performed better using manipulatives when practicing addition problems. They also performed better when building towers to represent the addition sentence.

Results and Data Analysis

- Students performed better by choosing to use visual and tactile strategies to solve mathematics sentences (see *Figure 1*).
- The ease and familiarity of choosing only tactile mathematics strategies limits student growth in solving more complex equations and using other strategies.
- Students learned best when choosing to use several strategies, using any combination of visual, tactile, kinesthetic, and auditory strategies.
- If students chose to not use introduced strategies, they better demonstrated their knowledge of the material.

Conclusion

- All students should be provided with multiple tactile and visual strategies to reinforce mathematics concepts.
- Administrators should provide teachers with the training and resources needed for implementing various mathematics strategies and how to allow and encourage student choice.
- Additional studies should be conducted on different ways student choice can be provided in lower elementary classrooms, and how students respond to these choices.