Anthony Espinoza

EDG500

January 23, 2023

Lab 1

For the research project, the topic would be the use of nonlinguistic representations. The study would be specifically target manipulatives in math. Nonlinguistic representations such as manipulatives are important because it makes a math problem come to life in a real world setting. A student may have a sense of what a half looks like when you cut a sandwich in half or even what a pizza pie would look like if you cut it in half, but it has been observed that the concept of half of a number or the concept of twice as much as a number can be tricky for students at first. When a teacher uses manipulatives such as counting blocks these math problems become visual and a little easier to understand. "When teachers use nonlinguistic representation strategies, they help students represent knowledge as imagery. These strategies are powerful because they tap into students' natural tendency for visual image processing…" (Marzanop et al., 2008, p.64). The question that would be tackled is the following, should manipulatives be used to introduce a new concept or should they be used as a supplement? This is subject to change as more options for research are weighed.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2008). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Association for Supervision and Curriculum Development.

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Lab 2

Donovan, A. M., & Alibali, M. W. (2021). Toys or math tools: Do children's views of manipulatives affect their learning? *Journal of Cognition and Development*, *22*(2), 281–304. https://doi.org/10.1080/15248372.2021.1890602

Andrea Marquardt Donovan (et al., 2021) conducted a research to find out if how students view math manipulatives affect the learning in the lesson. Some participants were told to use the manipulatives as toys before beginning the lesson. Another group was not told anything about the manipulatives before beginning the lesson and the last group got an explanation of how the manioulatives should be used. The research concluded that the group that received an explanation, did better.

Kabel, M., Hwang, J., & Hwang, J. (2021). Lessons learned from a rural classroom study: Transitioning from concrete to virtual manipulatives to teach math fact fluency to students with learning disabilities. *Journal of Curriculum Studies Research*, *3*(1), 42–68. https://doi.org/10.46303/jcsr.2021.7

Matthew Kabel (et al.,2021) studied the effects of technology in math, specifically the use of virtual manipulatives. Kabel also studied the effects of lack of funding and technology available in rural areas in regard to the use of virtual manipulatives. The results were positive in better funded schools but those students in rural areas found it difficult to transition to the use of virtual maniputlaives due to the lack of experience with technology.

Laski, E. V., Jor'dan, J. R., Daoust, C., & Murray, A. K. (2015). What makes mathematics manipulatives effective? lessons from cognitive science and montessori education. *SAGE Open*, *5*(2), 215824401558958. https://doi.org/10.1177/2158244015589588

Elida V. Laski (et al., 2015) studied the effectiveness of manipulatives in math. From the literature reviews conducted, four principles became apparent. The first being that manipulatives need to be used consistently. Second, instruction must begin with simple representations which become gradually more complex over time. The study also found that manipulatives must not be

a distraction by resembling other objects. Lastly, instruction must be explicit in the relationship between the maniputaitves to the concepts being taught. The researcher concluded that results of the use of manipulatives are inconsistent.

Liggett, R. S. (2017). The impact of use of manipulatives on the math scores of Grade 2 students. *Brock Education Journal*, *26*(2). https://doi.org/10.26522/brocked.v26i2.607

Robert S. Liggett (2017) studied the impact that using maniputlaives for a math exam has on second graders in a Northern Saskatchewan school. Two groups took a pre-test without manipulatives then were re-tested with one group having manipulatives and one without. Ligget noted, "…the results of this study suggest that the use of mathematical manipulatives in answering mathematical problems would be an asset to improving the students' learning and development" (Liggett, 2017, p. 97).