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Utilizing Mathematic Manipulatives in the Elementary Classroom

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Mathematic Manipulatives in a 4th Grade Classroom



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Acknowledgements

A special thanks to:

- My co-operating teacher for allowing me to implement my study into the classroom
- Students & families for giving consent & for participating in my study
- The Educational Studies staff at Illinois Wesleyan University for their guidance, support, & feedback
- Fellow future educators at Illinois Wesleyan University for support & feedback

Terms

- Math Manipulatives:** objects that are physically maneuvered by students in order to help them see actual examples of mathematical principles at work (Battle 9).
- Hands-on Activities:** activities using materials that appeal to several senses, can be touched, handled, or moved (Battle 7).
- Virtual Manipulatives:** replicas of physical manipulatives placed on the World Wide Web in the form of computer applets with additional advantageous features (Reimer & Moyer 6).

References

Battle, T. S. (2007). *Infusing math manipulatives: The key to an increase in academic achievement in the mathematics classroom*. final research proposal/Online Submission. Retrieved from <http://search.ebscohost.com.proxy.iwu.edu/login.aspx?direct=true&db=eric&AN=ED498579&site=ehost-live&scope=site>

Reimer, K., & Moyer, P. S. (2005). Third-graders learn about fractions using virtual manipulatives: A classroom study. *Journal of Computers in Mathematics and Science Teaching*, 24(1), 5-25. Retrieved from <http://search.ebscohost.com.proxy.iwu.edu/login.aspx?direct=true&db=eric&AN=EJ724762&site=ehost-live&scope=site>; <http://www.aace.org>



Research Questions

- How can I utilize manipulatives in math to support & foster student attention, comprehension, & retention of expected math skills at the 4th grade level?
- What manipulatives would be best in the 4th grade classroom?

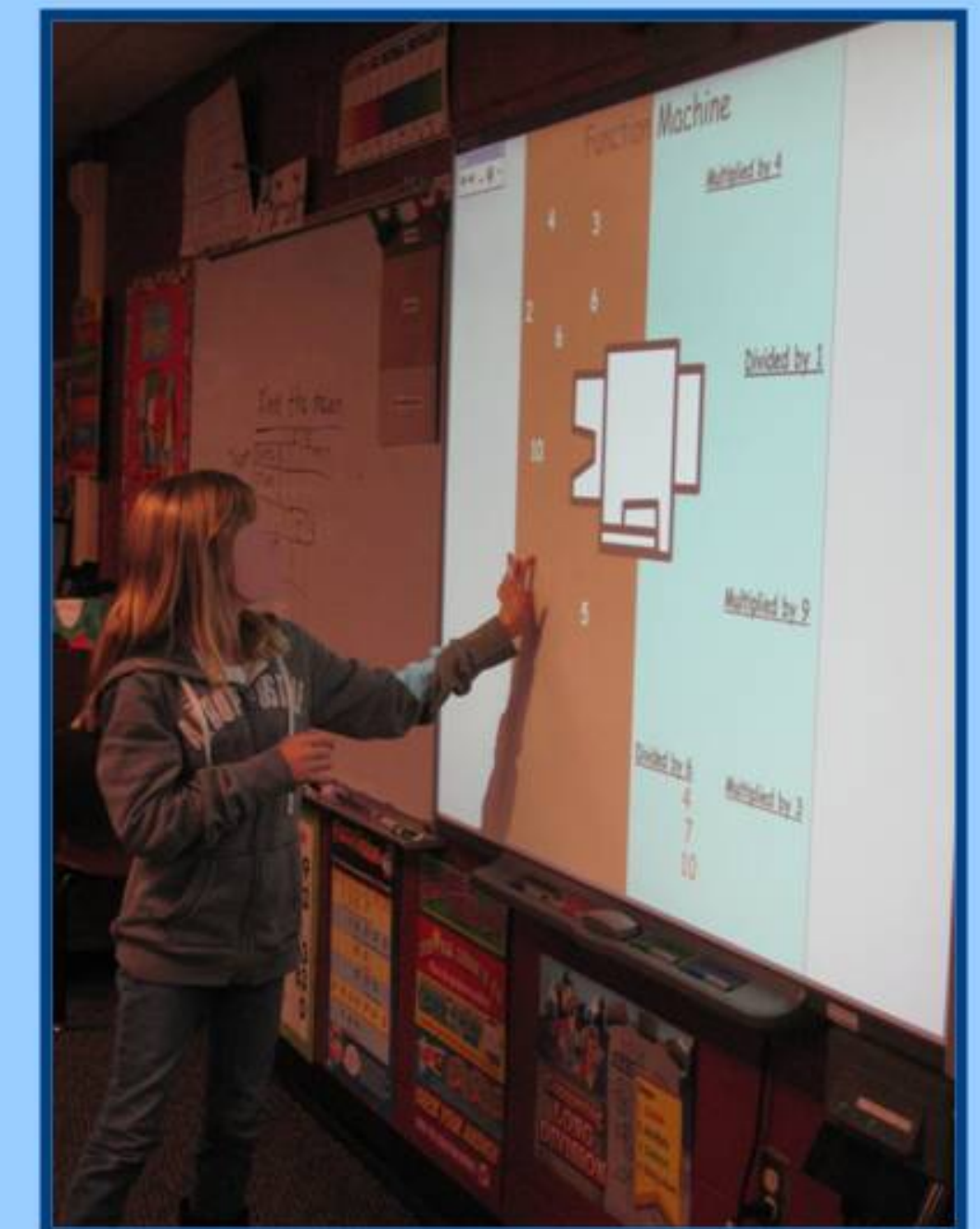


Participants

- Who:** 22 4th grade students-11 boys & 11 girls
- Who:** Students were primarily of white ethnicity
- Who:** Most students came from middle-class homes
- What:** Students participated in a series of math lessons, using a variety of manipulatives
- Where:** This study was constructed in a rural Midwest community

Manipulatives Used

- Base-10 blocks
- Playing cards
- Dry-erase boards
- Raisins
- Dice
- Tape measures
- Calculators
- Dominoes
- Post-it notes
- Smart Board (virtual)



Goals

Utilizing manipulatives:

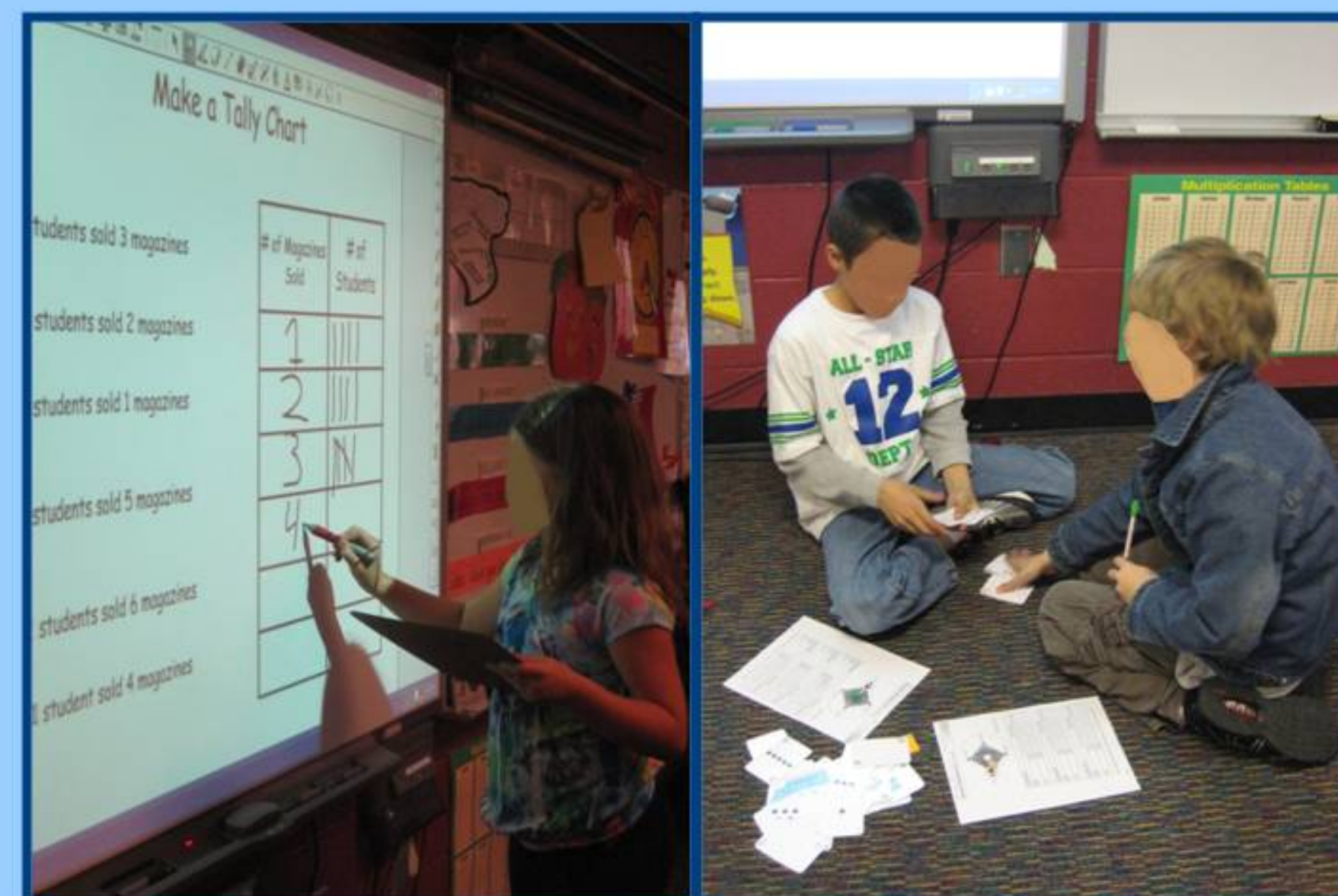
- To increase my knowledge about mathematic manipulatives
- To gain practice implementing manipulatives into my lessons
- To enhance my teaching strategies for mathematics
- To enhance student learning of mathematics
- To help make difficult math concepts applicable to students' lives
- To engage students in math activities

Methodology

Data was drawn from the following sources:

- Lesson plans
- Student work
- Personal observations & reflections
- Scholarly literature

"My research was conducted over the course of 45 minute math lessons for a 3 week period. Math lessons typically involved whole group & small group instruction with the implementation of a manipulative to engage & aid student learning. Mathematical concepts focused on in these lessons throughout this 3 week period included place value, gathering, displaying, & analyzing data, landmark numbers, addition with large numbers, & subtraction with large numbers. Manipulatives were utilized in lessons to introduce concepts, as a means of student communication, as place holders, & as tools. Students were requested to initially use the manipulative when a new concept was being introduced, but students then had the choice to decide what strategy worked best for them; paper & pencil or hands-on, concrete materials."



Findings

Through implementing manipulatives in math education I found the following:

- Manipulatives must be researched & practiced before applying
- It's important to provide instructions for all students on how to use manipulatives
- Modeling how to properly use manipulatives can help students better understand math concepts
- It is necessary for both teachers & students to have ample time to learn how to use the manipulatives
- Students should be given the option to use manipulatives because not all students learn in the same way
- 4th grade students did enjoy using manipulatives during math lessons
- The use of manipulatives often engaged all students in the mathematic activity
- The use of dry-erase boards involved all students in math lessons & allowed me to quickly determine students' comprehension of math concepts
- Virtual interactive games on the Smart Board increased students' participation during math lessons
- Virtual interactive games on the Smart Board helped all students to comprehend math concepts more quickly