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Sarah Pierpoint
Illinois Wesleyan University

Leah Nillas, Faculty Advisor
Illinois Wesleyan University

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Using Hands-on Activities and Manipulatives in Kindergarten
Sarah Pierpoint and Leah Nillas*
Educational Studies, Illinois Wesleyan University

Research Question
How do students learn in a hands-on learning environment which includes the use of physical and virtual manipulatives?

Hands-on learning refers to a method of instruction involving manipulative materials, problem solving, interactive technology, and authentic experiences to enhance the learning experience and process for students (Clark, Threeton, & Ewing, 2010).

Methodology
• 16 Kindergarten students in a rural, Midwest public school
• 15 mathematics lessons and 3 language arts lessons that involved hands-on activities were focused on during this study.
• Data from photographs, (see Figures 1 & 2) sample student work, and teacher journals were collected during student teaching.
• Grounded Theory (Glaser & Strauss, 1967) was used to analyze data.

Literature Review
• Clark, Threeton, and Ewing (2010) suggested that hands-on activities are most effective when paired with reflection on knowledge acquisition.
• Alghazo, Alsawaie, and Al-Awidi (2010) concluded that students demonstrated better understanding of mathematics concepts after working with physical and virtual manipulatives.
• Several research studies support the use of hands-on activities in teaching practices if activities are tailored to meet specific student needs and include reflection.
• More long term studies are needed to validate long term effects of hands-on activities on retention of concepts.

Results and Data Analysis
• Student participation, engagement, collaboration, and performance were emerging themes resulting from content analysis of photographs.
• Student work samples analyzed indicated more than half the assessments given after a hands-on activity received a Consistently Applied (CA, 100% correct) or Developing (Dev, greater than 50% correct).
• Teacher journals supported photographic evidence of student participation and engagement in all language arts lessons and 13 mathematics lessons.
• Findings indicate hands-on activities have a positive impact most of the time on participation, engagement, collaboration, and performance.

Conclusion
• Findings indicate that incorporating hands-on activities and manipulative materials into teaching practices to enrich direct instruction has a positive influence on student participation, engagement, collaboration, and performance.
• Findings support Burns and Hamm’s (2011) suggestion that students do in fact benefit from additional materials to supplement the lesson and give them the chance to explore concepts through touch.
• These findings are based on a study completed in only one classroom and one age group. Additional studies need to be conducted over a longer time period.