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Count Me In Update

You may remember that your child participated in a mathematics research project at the school from 2004-2007. The children were interviewed individually and parents and teachers completed some questionnaires. Over 500 children (then in Kindergarten through Grade 5) participated in the study over the 4 years from 10 schools across Manitoba and Ontario. As it takes time to analyze the findings of the project, this newsletter contains an update of our results. We have now published 4 papers from the data and we have made over 100 conference presentations all around the world! We have also expanded our research to include studies with early childhood educators and with families from varied backgrounds. Your involvement in the study has allowed us to learn about the processes involved in children's math development. We hope you enjoy the summary! More detailed information can be obtained on our website: http://www.carleton.ca/cmi .

Math at Home: Experience Matters!

Many teachers provide mathematics enrichment activities to do at home. Our research shows that this exposure is important. Children's involvement in informal mathematics activities such as doing mazes, playing board and card games, and having conversations about numbers were associated with higher mathematics performance on our assessments. You do not necessarily need to teach your child mathematics facts, but the exposure to mathematics in everyday contexts shows children that numbers are important and fun.

Many parents claim they do not like math or they are not good at math. These attitudes and expectations affect your child. Our study showed that children with high mathematics achievement scores had parents with strong academic expectations. Be positive and encouraging. Mathematics is taught differently now than when you were in school.

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We're on the Web!
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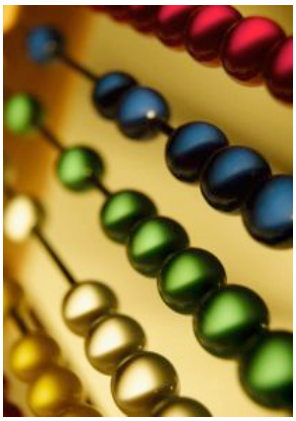

Got Place Value?

Learning the place value system is critical for children's mathematical development. We found that in Grade 1, children who understood place value concepts in the hundreds and thousands (e.g., knowing what the '4' in 465 means) were quite strong on other mathematical measures (e.g., arithmetic, numeration, and conceptual knowledge). By Grade 2 and 3, however, most children understood place value and those who did not were doing poorly on all math measures. These findings support the view that acquiring place value understanding is central in children's early mathematical development. Teachers could target children whose place value knowledge is not developing for special help by the end of Grade 2.

Pathways to Numeracy

We have learned about three knowledge areas that are relevant for developing math skills. This finding was published in an internationally renowned journal in Child Psychology. ***Quantitative skills*** include the ability to determine small quantities (like one, two and three) without counting, as well as children's internal mental representations of number. ***Linguistic skills*** include children's verbal abilities as they relate to mathematics such as knowing number words. These linguistic skills are also important when children learn to read. ***Spatial attention*** skills include children's abilities to pay attention to spatial cues and use working memory to solve problems. Children who have a deficit in one knowledge domain may compensate by using skills from one of the other two domains, so using a variety of teaching methods is important.

Adding Working Memory to the Puzzle

We have learned that attention and working memory are important for math learning. Children with ADHD often have difficulties with mathematics, even though they do not appear to have a specific problem with numbers or quantities. Analysis of Grades 2 and 3 data suggests that children with strong working memory skills are advantaged in two ways compared to peers with weaker working memory skills. First, they acquire knowledge about the number system and about mathematics procedures more easily. Second, they develop fluency with basic arithmetic skills more quickly. We found that children with strong working memory skills continue to develop arithmetic fluency at a higher rate than peers. Our results suggest that children with weaker working memory skills may need help with math knowledge, acquiring fluency, and training in working memory skills in general (although our study did not test the latter).