RESEARCH ON THE EARLY NUMERACY CURRICULUM . . .

The **Early Numeracy** curriculum was developed through Project MASTERY—which stands for **math and science teaching** that promotes clear **expectations** and **real learning** across **years**—for students with significant cognitive disabilities. Project Mastery is housed at the University of North Carolina, Charlotte, and is evaluated in the Charlotte-Mecklenburg School System. This project was funded by the Institute of Education Sciences (IES) Special Education Research Grant # R324A080014 awarded to the University of North Carolina, Charlotte. The principal investigator (PI) was Dr. Diane Browder and co-PI was Dr. Fred Spooner.

The Early Numeracy curriculum was built on research and was field-tested; however, more research is needed to extend the evidence base. Seven students with severe disabilities, including students with autism and moderate-to-severe intellectual disabilities received daily math instruction using the Early Numeracy curriculum, and participated in general education math classes with peers of their same chronological ages. The grant staff trained three special education teachers to implement with fidelity the Early Numeracy curriculum in their self-contained classrooms. In addition, the grant staff trained three special education paraprofessionals to embed instruction with fidelity in the general education classroom.

The researchers examined the performance of the students who participated in the pilot study (Browder et al., 2012). It is important to note that Unit Four was not field-tested due to time constraints and the school year ending. Results showed that all students acquired targeted early numeracy skills across units. Generalization of skills was observed across units prior to instruction for each student. This is likely due to the fact that there was carryover in the skills from unit to unit because the skills were broken down into learning objectives based on developmental progressions. For example, in Unit One, students made a set of 3 objects, in Unit Two, a set of 4 objects, and in Unit Three, a set of 9 objects. However, once students mastered learning to count with one-to-one correspondence and began subitizing (seeing how many

without counting), they were able to do so with any number of objects. Overall, generalization was only observed in the numbers and operations skills and patterning, but was not observed in the measurement skills. One interesting finding was that students were better able to perform the skills within the general education math setting when the trials were embedded within the daily instruction versus during the assessment which was given by grant staff in the self-contained classroom. This was likely due to the length of the assessment and satiation from being assessed weekly. The findings from the field test were very promising.

Additionally, Jimenez and Kemmery (2012) conducted a singlesubject multiple probe across classrooms study that investigated the effect on early numeracy skills on five students (within three classrooms) when using the Early Numeracy curriculum. Three teachers of students with significant disabilities used the Early Numeracy curriculum to teach five elementary students (ages 7–11) early math skills. During baseline, all five students had limited early numeracy skills (ranging from 4.2%-34% mastery, with a mean of 17.8%). After teaching Unit One of the Early Numeracy curriculum, all five students significantly increased their early numeracy skills (ranging from 13.3% to 44% mastery, with a mean of 28%). Two of the three classrooms (n = 3) received training in Unit Two of the curriculum; the other class ran out of time due to the end of the school year. After teaching Unit Two of the curriculum, all three students significantly increased their early numeracy skills (ranging from 30-54% mastery, with a mean of 46%). Due to the end of the school year, Units Three and Four were not assessed. While data from this study only showed mastery at 46% of the total skills, it is important to note that only 48% of the total early numeracy skills within Units One and Two were taught. All five students showed a significant increase in early numeracy skills in spite of the brief period of instruction (2-3 months) with this curriculum (Jimenez & Kemmery).

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