REVIEW

Early Childhood Mathematics Intervention

Douglas H. Clements[1]

1E5). Fortunately, research-based early childhood mathematics interventions

developers have designed research-based interventions. These positively affect children's competencies in mathematics and beyond.

Scientific Interventions

Several research-based interventions for 3- to 5-year-old children have been scientifically evaluated with positive effects, including Rightstart (4), Pre-K Mathematics (17, 18), and Building Blocks (12), while others show promise but await rigorous evaluation, such as Big Math for Little Kids (19). Two of these interventions share several characteristics, allowing the abstraction of general principles guiding effective interventions for preschool children. We first describe the two interventions and their initial empirical support, then describe their shared characteristics.

The authors of the Rightstart program theorized that children separately build initial counting competencies, intuitive ideas of quantity comparison, and initial notions of change (e.g., a group gets bigger when items are added). The integration of these separate ideas forms a central conceptual structure for number. On this basis, activities were designed to help children build each separate competence and then integrate them. For example, the program used games and experiences with different models of number (e.g., groups of objects, pictures, thermometers, or dials; the program was renamed Number Worlds to emphasize this characteristic) to develop children's central conceptual structure for number.

This program improved young children's knowledge of number, which supported their learning of more complex mathematics through first grade (4). In a 3-year longitudinal study, children from low-resource communities who experienced the program from kindergarten surpassed both a second low-resource group

recognize the mismatch29). Thus, teachers need integrated knowledge of all three components of learning trajectories: the mathematical content (goal), the developmental progressions of children's thinking and learning, and instruction-