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Fostering Early Math Comprehension: Experimental Evidence from Paraguay

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Abstract

Research indicates that preschool children need to learn pre-math skills to build a foundation for primary- and secondary-level mathematics. This paper presents the results from the early stages of a pilot mathematics program implemented in Cordillera, Paraguay. In a context of significant gaps in teacher preparation and pedagogy, the program uses interactive audio segments that cover the entire preschool math curriculum. Since Paraguayan classrooms tend to be bilingual, the audio and written materials use a combination of Spanish and Guaraní. Based on an experimental evaluation since the program's implementation, we document positive and significant improvements of 0.16 standard deviations in standardized test scores. The program helped narrow learning gaps between low- and high-performing students, and between students with trained teachers and those whose teachers lack formal training in early childhood education. Moreover, the program improved learning equally among both Guaraní- and Spanish-speaking students. But not all learning gaps narrowed as a result of the program. Although girls improved significantly, boys improved much more, ultimately increasing the gender gap. To close this gender gap, the program has been modified to encourage girls' increased participation in the classroom and general interest in math.

Keywords

initial education, preschool, early education, mathematics, Paraguay
JEL: I21; I28; J24; O15; O54

Introduction

An increasing body of evidence suggests that the development of pre-math skills at an early age is more important than previously thought in order to foster later mathematical understanding and problem-solving skills. Geary, Hoard, Nugent, & Bailey (2013) find that early knowledge about

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