Researchers
Emma Naslund-Hadley
Inter-American Development Bank

Juan Hernández-Agramonte
Senior Director, Embedded Labs

Staff
Maria Luisa Zeta Valladolid
Senior Research Associate

Gabriella Wong
Research Associate

Timeline
2018-2019

Sample Size
367 schools

Research Implemented by IPA
Yes

The Effects of a Bilingual and Intercultural Preschool Math Program in Panama

Abstract

Basic “pre-math” skills in young children have been shown to be important for developing later mathematics competency. In Panama, math scores are lower than other Latin American countries and there are large performance gaps between indigenous and non-indigenous areas. Researchers are evaluating the impact of bilingual and intercultural preschool math curricula on the math skills of preschool-aged children.

Policy Issue

An early basic understanding of numbers, “pre-math”, in young students has been shown to be an important foundation for later math learning.[1] Tests show that students in Latin America lag behind the rest of the world in math and science skills. Within Latin America, Panamanian students consistently underperform, with more than half of third-graders not achieving basic grade-level competency.[2] Within Panama, large performance gaps exist between indigenous and non-indigenous areas. This study builds on previous research that has found inquiry- and problem-based mathematics programs to be effective in better developing math skills at the preschool level.

Context of the Evaluation

The evaluation is taking place in Panama's Ngäbe region, home to its largest indigenous population and the most impoverished region in the country. This region has higher illiteracy and primary school dropout rates than the national average. The Ministry of Education and Inter-American Development Bank modeled the evaluation from the Tikichuela program in Paraguay, which used audio lessons to bring a pre-math curriculum to preschool classrooms. The program contrasts with the traditional curriculum, which previous research has found focuses on direct transmission of mathematics concepts.

Details of the Intervention

Researchers are conducting a randomized evaluation to test the impact of bilingual and intercultural preschool math curricula on the math skills of preschool-aged children. Researchers will randomly assign 536 schools in Ngäbe to three groups:

1. Schools receiving a bilingual curriculum
2. Schools receiving a bilingual curriculum that includes an intercultural program, consisting of math content adapted to the Ngäbe culture; and
3. Schools in the comparison group.

In both treatment groups, researchers will adapt the Tikichuela curriculum to the Panamanian context and languages, creating audio lessons on CD in both Spanish and Ngäbere. These lessons can be used in classrooms regardless of variation in individual teachers' preparation or pedagogical skill. Teachers will be trained to play the 30-40 minute lessons five days a week. Lessons will also be implemented using complementary materials such as student workbooks with exercises instructed by the characters in the lessons, along with physical objects for counting and other illustrative material to help assimilation of mathematical concepts.

Researchers will conduct an initial survey of all of the students evaluating basic numeracy and early math skills, along with other areas such as reading and writing, which the program could conceivably also affect. Teachers, principals, and parents will also answer questions on socio-demographic information for students and schools. One year later, a follow-up survey will be conducted collecting the same information as the initial survey.

Results and Policy Lessons

Study ongoing; results forthcoming.

Sources

[1] Geary,David C., Mary K. Hoard, Lara Nugent and Drew H. Bailey. 2013. “Adolescents’ Functional Numeracy is Predicted by Their School Entry Number System Knowledge.” Plos One 8(1): 1-8.

[2] Third Regional Comparative and Explanatory Study. 2015. “Logros de Aprendizaje Panamá.” UNESCO. http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/Ficha-Logros-del-Aprendizaje-Panama.pdf

August 15, 2018