Longitudinal investigation of the curricular effect on students’ learning of algebra

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Abstract: In this talk, I will present the results from a longitudinal examination of the impact of a Standards-based or reform mathematics curriculum (called CMP) and traditional mathematics curricula (called non-CMP) on students’ learning of algebra using various outcome measures.

My talk will be focusing on the question: what are the similarities and differences in performance between CMP students and a comparable group of non-CMP students on tasks measuring a broad spectrum of mathematical thinking and reasoning skills, with a focus on algebra? Findings include the following:

- students did not sacrifice basic mathematical skills if they are taught using a Standards-based or reform mathematics curriculum;
- African American students experienced greater gain in symbol manipulation when they used a traditional curriculum;
- the use of either the CMP or a non-CMP curriculum improved the mathematics achievement of all students, including students of color;
- the use of CMP contributed to significantly higher problem-solving growth for all ethnic groups; and

a high level of conceptual emphasis in a classroom improved the students’ ability to represent problem situations. (However, the level of conceptual emphasis bears no relation to students’ problem solving or symbol manipulation skills.)

Dr. Bikai Nie received his Ph.D. in Mathematics Education from East China Normal University in 2004. He received a Master’s Degree in Statistics from the University of Delaware in 2013. As a Research Associate at the University of Delaware, he worked on a series of mathematics education research projects, in which his research focused on investigating the impact of mathematics curricula on 6th-12th graders’ math studying and teachers’ teaching. His research interests include the preparation for pre-service math teachers, professional development for in-service mathematics teachers, mathematics curricula for K-16, problem solving, problem posing, and quantitative methods in mathematics education research. His teaching interests include Mathematics for K-12 Teachers, Quantitative Methods in Education Research, Statistics, Pre-Calculus, and Calculus.