

THE MATHEMATICS ENDORSEMENT RESEARCH GROUP (MERC)

Lynn C. Hart, Susan Lee Swars, Stephanie Z. Smith, Marvin E. Smith, Tammy Tolar
Georgia State University
lhart@gsu.edu

There is an abundance of literature on the need for highly developed, specialized content knowledge for teaching elementary mathematics (i.e., How People Learn and Knowing and Learning Mathematics for Teaching, National Research Council; Adding it Up, Mathematics Learning Study Committee). There is also a large body of research on the important role beliefs play in teaching mathematics (Thompson, 1992; Cooney & Sealey, 1997; Töerner & Pehkonen, 1999). Study of the relationship of these factors to teacher development is the purpose of the Mathematics Endorsement Research Group (MERC). This poster session shares results from the first year of a four year research project analyzing change in and comparison of the beliefs and mathematics content knowledge of two groups of undergraduate preservice elementary teachers.

MERC is the outcome of a recently mandated four-course mathematics sequence required by the Board of Regents in the State of Georgia for undergraduate elementary teachers. Previously, early childhood students were required to take two mathematics methods courses in early childhood and two mathematics courses in the mathematics department. With the new mandate, requirements changed to four mathematics courses and one mathematics methods course. Members of the mathematics education faculty in early childhood were curious about the impact of these changes on beliefs and content knowledge of preservice teachers.

The project will follow four cohorts of students ($n = 139$) who matriculate through the old program and four cohorts of students ($n = 180$) who matriculate through the newly mandated program. Data on beliefs will be collected for each cohort upon entry into the program, at each transition point between semesters, and at the end of the program. Content knowledge data and demographic information for each cohort will be collected at the end of the program.

As of Spring, 2006, the mathematics teaching efficacy survey (Enochs, Smith & Huinker, 2000) and the beliefs about math pedagogy survey (Peterson, Fennema, Carpenter & Loef, 1989) were administered four times to two old program cohorts ($n = 65$). Four subscales within the surveys were used: self-efficacy (SE), outcome expectancy (OE), children construct their own math knowledge (CONST), and math teaching should facilitate children's construction of math knowledge (FACIL). Mathematics content knowledge for each group was measured after student teaching using the Learning Mathematics for Teaching Instrument (Hill, Schilling & Ball, 2004).

Using demographic data of age, race and high school background we asked: *What are the predictors of initial mathematics teaching beliefs? What are the predictors of change in those beliefs?* In addition, we asked: *Is there is a relationship between teachers' beliefs and the specialized content knowledge necessary for teaching elementary mathematics?* We also analyzed the effect of grade level placement and socio-economic status (SES) of the student-teaching school on change in beliefs about teaching mathematics.

Based on hierarchical linear modeling (HLM), we found that math teaching content knowledge was related to initial SE, CONST, and FACIL beliefs. None of the demographic variables were related to initial beliefs. Once content knowledge was included in the HLM models to explain initial differences in these beliefs, it was not related to change in beliefs. Age was a significant predictor of change in beliefs for all subscales with students older than 23 years showing slightly more growth in beliefs than students between 18 and 23 years. Finally, SES of

the student-teaching school predicted change in SE and FACIL. Student-teachers in low, medium and high SES schools differed in the change in their beliefs with those in high SES schools showing more significant change towards standard's based beliefs.