Exploring Early Math Teaching & Learning in Community College ECE Programs
Amanda Armstrong, M.S., Lisa Ginet, Ed.D. & Sameera Warisi, B.S.

**Introduction**

- NAEYC & NCTM affirms that "high-quality, challenging, and accessible mathematics education for 3- to 8-year-old children is a vital foundation for future mathematics learning."
- Early mathematics understanding significantly predicts school achievement in later years.  
- Early intervention specifically focused on mathematics has broad positive effects on student learning. 
- In Illinois, early childhood education programs in community colleges are a major teacher preparation force for daycare and Head Start centers across the state. 
- In a recent Erikson study, we found that the number of pre-service math methods classes teachers had was significantly related to confidence in their ability to help preschoolers learn mathematics, and the amount of time they reported teaching math in the classroom.

**Methods**

- We collected data from multiple stakeholders to ensure our findings were complete, representative, and accurate. 
- Program & Syllabus Review. Online catalogs of early childhood education programs from ten community college programs were analyzed. Faculty from additional community colleges were invited to submit their syllabi for review. 
- Interviews. Chairs of ECE programs at ten community colleges in the Chicago area were interviewed in person and via Skype; all were audio-recorded and transcribed. 
- Focus Groups. Fifteen faculty who have taught ECE math methods courses participated in one of two discussions focused on faculty goals for students in math method and the effect of students' experiences (with children and math) on their success in math methods course. The focus groups were held at Erikson Institute; two graduate assistants took notes during the discussions, and the discussions were audio-recorded and transcribed. 
- Surveys. Thirty-four community college students enrolled in a math/science methods course completed our two on-line surveys at the beginning of their course. The ABC-EM survey contained 26 statements relating to respondents' attitudes, beliefs, and confidence about mathematics; respondents were asked to rate each statement from 1 ("strongly disagree") to 10 ("strongly agree"). We re-coded ratings of negative statements (e.g. "I am NOT a math person") so that it always represents a negative attitude or low confidence; we then grouped responses into "low" (1-2,3), "medium" (4-6,7) and "high" (8-10).

**Results**

- **CC Faculty Perception of Teaching Early Math**
  - ECE faculty at community colleges feel that there is not enough time to focus on math content and methods.
  - Math requirements for ECE degrees at ten community colleges were examined. ABC-EM exam results revealed the concerns and challenges faculty experience when teaching early mathematics in their ECE programs.
  - The Erikson Early Mathematics Education Project plans to incorporate what we have learned into our development of materials and training to strengthen early mathematics education at the community college level.

- **CC Faculty Perception of ECE Students**
  - Students have had negative experiences with math with may lead to negative ideas and feelings about the subject. This impacts how they perceive the early mathematics course.
  - Negative attitudes and lack of confidence also affect ECE students' choice to audit taking general math, if at all possible.
  - Compared to language development and literacy, ECE students have little understanding of foundational mathematics ideas.
  - Students have little understanding of what quality early math practices look or feel like.

- **Focus Groups**
  - Professional development for community college faculty could deepen their understanding of foundational mathematics and increase their repertoire of teaching tactics.
  - More math-rich and intentional instruction in ECE math methods courses could deepen ECE students understanding of foundational mathematics, increase their confidence, and improve their attitudes.
  - The Erikson Early Mathematics Education Project plans to incorporate what we have learned into our development of materials and training to strengthen early mathematics education at the community college level.

- **Surveys**
  - The ABC-EM and PCK-EM surveys are tools that have not yet been fully validated.
  - More respondents ranked these statements in the low range than in the high range.

**Discussion**

- **Implications**
  - The sample size was fairly small in all areas of data collection.
  - Our questions in the interviews and focus group may have been biased by our own experience and may not have covered all aspects of this complex situation.
  - Both the ABC-EM and PCK-EM surveys are tools that have not yet been fully validated.

- **References & Glossary**

- **Facility concerns focused on students’ attitudes towards and understanding of foundational mathematics, as well as on their own access to early math resources and their own confidence in using early math to later math.**