

## ***Questions of Interest to CSMC Researchers***

### Curriculum Design and Analysis

- What are the critical design features of mathematics curriculum materials that support effective teaching and student learning (e.g., nature of tasks, range of tasks, sequence of tasks, presentation of tasks)?
- How can curriculum materials be designed to better serve the learning needs of all students, including reluctant learners and those from diverse cultural backgrounds?
- What are the developmental trajectories of major mathematical topics when considered from a mathematical structure perspective? From an algorithmic perspective? From a historical perspective? From a cognitive science perspective?
- How can curriculum materials be designed to capitalize on continued advances in the mathematical sciences? In computing technologies?
- What evaluation tools are most effective when studying and analyzing curriculum? What information do they yield for various purposes and what are their limitations?

### Curriculum Adoption and Enactment

- To what extent and in what ways do teachers of mathematics use instructional materials such as the district-adopted textbook and/or district or state curriculum frameworks? How do teachers adjust/supplement curriculum materials? For what purposes?
- What processes do districts/schools/teachers use in selecting mathematics curriculum materials? Do the processes used in state-adoption states differ from those in states with open textbook adoption? If so, in what ways?
- How do various factors (e.g., contextual factors--such as length or organization of class periods or access to technologies; teacher attributes--such as, knowledge of content or beliefs about mathematics; external factors--such as parents or administrators) influence how mathematics curriculum materials are used?
- What influence does professional development based on curriculum investigation and implementation have on teachers use of particular types of mathematics curriculum materials?
- To what extent do mathematics instructional materials support or limit various facets of the work of teaching (e.g., planning, guiding student discussion, selecting tasks)?

### Curriculum and Student Learning

- What are the patterns of student learning and continued study of mathematics associated with regular and sustained use of various kinds of instructional materials? How are those patterns related to fidelity of intended use?
- To what extent and in what ways do students utilize instructional materials (e.g., textbooks, technology) and how does this use impact student conceptions of, and

- dispositions toward, mathematics?
- To what extent do various kinds of curriculum materials differentially foster the mathematical development of all students, especially underserved populations? Do they widen/narrow existing achievement gaps in mathematics?

#### Curriculum and Teacher Knowledge and Beliefs

- To what extent and in what ways do adoption and enactment of new mathematics instructional materials impact teachers' conceptions of mathematics? Mathematical content knowledge? Pedagogical content knowledge? Teaching methods and instructional practice? Dispositions toward mathematics teaching?
- To what extent and in what ways do mathematics instructional materials influence the learning of teachers? What is the influence of teacher experience and/or teacher preparation in this process? What mathematics curriculum design features may be of most use to particular groups of teachers (e.g., novices, teachers with differing mathematics content backgrounds)?
- What is the impact of alignment (or misalignment) of teachers' beliefs (about mathematics and learning) and curriculum material implementation?

#### Policy and Curriculum

- To what extent and in what ways do national educational policies (e.g., NCLB or the Common Core State Standards initiative) influence the content of state and local mathematics curriculum frameworks, mandated accountability systems, and district adopted curriculum materials?
- To what extent does high-stakes testing affect mathematics curriculum development, mathematics curriculum selection, and mathematics curriculum implementation?
- What are the impediments to better articulation between pre-college and college mathematics curricula and how might they be addressed?