Teacher Perspectives on the Common Core State Standards in Mathematics

Summary:
As a means of improving the mathematics education of K-12 students in the U.S., teachers in 45 states are now expected to utilize the academic standards of the Common Core State Standards for Mathematics (CCSS-Mathematics) in their daily classroom instruction (CCSS, 2010). The CCSS-Mathematics is intended to deliver increased rigor and depth of the mathematical understandings of K-12 students, while potentially requiring increased specialized mathematics content knowledge and fundamental changes in instructional practices of mathematics teachers (Schmidt, 2012). Ultimately, the difficulty of transitioning to the CCSS-Mathematics lies in putting the standards into classroom practice, with teachers having control over how this will play out (Dacey & Polly, 2012). In this study, a mixed methods design was used to examine teachers’ perspectives on the newly implemented CCSS-Mathematics, which in this particular context are implemented as the Academic Knowledge and Skills (AKS) Curriculum aligned with the state-adopted Common Core Georgia Performance Standards (CCGPS). Survey/questionnaire and interview data provided insights into teachers’ awareness of the standards, their views of the standards and potential to transform their teaching practices and student learning, their views of integration of the standards in classroom instructional practices, and supports and hindrances related to understanding and enacting the standards. The findings will provide insight into the professional needs of teachers and ways they can best be supported during this critical time of transition to the CCSS-Mathematics, with the end goal of improving student learning and achievement.

The CCSS-Mathematics represents a major overhaul of the standards previously used in most states adopting these new standards. The standards include critical areas of mathematics for kindergarten through grade 8 in order to provide for a coherent and focused curriculum built around big ideas. These critical areas are called domains, and there are 11 related to grades K-8. In addition, the CCSS-Mathematics go beyond specifying mathematical content and also include Standards for Mathematical Practice, with an emphasis on applying mathematical concepts and skills in the context of authentic problems and understanding concepts rather than merely follow a sequence of procedures. Implementation of the standards in classrooms includes an increased emphasis on problem solving, reasoning, representation, connections, and communication. The standards were also created with strong consideration for the research base about the development of students' understandings of mathematics over time (Cobb & Jackson, 2011). As such, the topics at particular grade levels are different, with this re-sequencing reflecting current research and practice related to learning trajectories (Sztajn, Confrey, Wilson, & Edgington, 2012). In addition, new summative assessments are being created that align with the rigorous and in-depth expectations of the mathematical content and practices. Given these significant shifts proposed by the CCSS-Mathematics, its introduction will require a significant overhaul of mathematics education in K-12 schools (Schmidt & Houang, 2012).
As mentioned, the CCSS-Mathematics is guided by Standards for Mathematical Practice describing the “expertise that mathematics educators at all levels should seek to develop in their students” (CCSS-M, 2010, p. 6) that are founded upon “processes and proficiencies” critical to mathematics education. These standards for practice were derived from the NCTM’s process standards of problem solving, reasoning and proof, communication, representation, and connections, as described in *Principles and Standards for School Mathematics* (NCTM, 2000). When considering the standards for practice, teachers are to look for and provide instruction that includes *points of intersection* between the mathematical practices and content, requiring a pedagogical approach that is different from what is found in many mathematics classrooms in the U.S.

Whether or not K-12 students learn the CCSS-Mathematics will depend upon teachers’ instructional expertise (Schmidt & Houang, 2012). The introduction of the CCSS-Mathematics requires many mathematics teachers to change what and how they teach and therefore calls into question their readiness for implementing these standards. Phillips and Wong (2012) suggest “. . . that moving from the standards on paper to the deep changes required in practice will be a significant challenge” (p. 31). For example, many standards designated for a particular grade may be reintroduced unnecessarily over the course of several years and spanning different grade levels if teachers continue to rely on past standards implementation schedules (Gewertz, 2012). In addition, Schmidt and Houang (2012) suggest that many teachers view the CCSS as predominantly the same content as their state’s previous standards and this lack of awareness poses significant difficulties during the transition from the previous standards to the CCSS. Further, the CCSS-Mathematics propose that teachers focus on fewer “big” mathematical ideas so students will: build conceptual understanding, achieve procedural skill and fluency, and learn how to transfer what they know to solve problems in and out of the mathematics classroom (Phillips & Wong, 2012). In order to develop these student understandings, Ewing (2010) contends, “Teachers must have deep and appropriate content knowledge to reach that understanding; they must be adaptable, with enough mastery to teach students with a range of abilities; and they must have the ability to inspire at least some of their students to the highest levels of mathematical achievement” (para. 6), highlighting some of the necessary teacher competencies for teaching the CCSS-Mathematics.

**Rationale:**
The Common Core State Standards in Mathematics will have a significant impact on teacher practice and will play a role in the further policy development in public schools in the United States. Research on teacher perceptions of the Common Core State Standard in mathematics is then necessary to inform educational policymakers as to the impact, both positive and negative, their decisions are having on teachers and schools. This research will also allow the educational community the opportunity to understand the impact that new math standards have both on teacher instructional practice and student learning. Additionally, developing an understanding of teacher perceptions of the CCSS in mathematics will assist in
determining the benefits and risks of implementing new common state standards. This information will be a guide for moving forward with mathematics reform in schools.

**Research Objectives:**
This project aims to understand teacher perceptions on the newly implemented Common Core State Standards in Mathematics.

**Design:**
In this study, a mixed methods design was used to examine teachers’ perspectives on the newly implemented CCSS-Mathematics, which in this particular context are implemented as the Academic Knowledge and Skills (AKS) Curriculum aligned with the state-adopted Common Core Georgia Performance Standards (CCGPS). Survey/questionnaire and interview data provide insights into teachers’ awareness of the standards, their views of the standards and potential to transform their teaching practices and student learning, their views of integration of the standards in classroom instructional practices, and supports and hindrances related to understanding and enacting the standards. It is hoped the findings will provide insight into the professional needs of teachers and ways they can best be supported during this critical time of transition to the CCSS-Mathematics, with the end goal of improving student learning and achievement.

**Data Collection:**
At a suburban elementary school in the Southeastern United States, elementary teachers K-5 (90) who teach mathematics were asked to complete a combined survey/questionnaire addressing perceptions of the CCSS-Mathematics, which took about 20 minutes to complete. This survey also contains a few demographic items addressing current grade level, years of teaching experience, gender, and highest level of educational attainment. These teachers completed this survey/questionnaire during their grade level instructional planning time, administered by the two researchers on the project. Also, six randomly selected teachers were asked to participate in individual, semi-structured interviews, which will take about 30 minutes to complete. Using a random number generator, the researchers generated a random list of teachers to be contacted. The researchers contacted teachers on the list until six agreed to be interviewed. An interview protocol addressing perceptions of the CCSS-Mathematics is included in the appendix. The interviews will be conducted by the researchers and at the convenience of the teachers at the school site. With permission, all interviews were audio-taped. The researchers on the project were responsible for all aspects of data collection, analysis, and interpretation.
Outcomes:

We hope to contribute to the mathematics education community and the struggles teachers face in implementation of the new standards.

References


