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Abstract

The purpose of this paper is to provide a brief history of how the perspectives of mathematicians, educators, parents, policy makers, administrators, and other experts in mathematics education have added to the standards reform starting with the publication of the Curriculum and Evaluation Standards for School Mathematics by the National Council of Teachers of Mathematics (NCTM, 1989) and arriving at our current place in time with the beginning implementation of the Common Core State Standards (CCSS) in the fall of 2012. In addition, the "Math Wars" (Schoenfeld, 2004, p. 253) will be addressed as well as the various publications of standards that have evolved after the aforementioned NCTM publication in 1989. The paper ends with concluding thoughts on the future implementation of the CCSS in mathematics classrooms.

Keywords: mathematics education, state standards
As a veteran mathematics teacher in the state of New Jersey, I have implemented the Common Core State Standards (CCSS) since they were adopted by the state in 2010. In this paper I explore the development of CCSS, which began with a mathematics education reform movement that was already occurring during my first years of teaching in the 1990s. The debate was known as the “math wars” (Schoenfeld, 2004, p. 253). The math wars were controversial, with parents, educators, administrators, and policy makers favoring either the traditional or reformed teaching of mathematics (Schoenfeld, 2004). But does the implementation of CCSS imply that the debate has ended, as some have suggested (i.e. Leinwand, 2012)? As a teacher, I ask whether implementation of CCSS will have an effect on pedagogy, or is this yet another temporary change. This paper focuses on events that led to CCSS and asks the reader to consider the question of whether it is possible to end the debate characterized as “math wars,” and what the debate is about.

The 2009 collaboration between the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO) was a major catalyst for the inception of the CCSS. With input from teachers, school administrators and other considered experts (NGA Center & CCSSO, 2010a; Heck, Weiss, & Pasley, 2011), their joint objective was to supply a clarified and relevant framework to prepare students for college and work, allowing for consistency across the states and providing expectations for student learning from kindergarten through grade 12 (Achieve, 2012b; NGA Center & CCSSO, 2010b). However, the initiative to develop national standards began much earlier, at the 58th annual National Council of Teachers of Mathematics (NCTM) conference in 1980. That year, Shirley Hill, the president of the NCTM, proposed that mathematics education should shift its focus from computation to problem-solving (NCTM, 2007, p. 63). Hill and the NCTM “sought support of the ‘lay population’ even before it presented its goals for the 1980s, goals that were in conflict with the priorities of the back-to-basics movement of the 1970s” (NCTM, 2007, p. 60).

With financial support by the NSF, a survey, Priorities in School Mathematics (PRISM), was created that would include contributions of those with an interest in mathematics education (NCTM, 2007). The survey included “elementary teachers, secondary teachers, two-year college mathematics teachers, mathematics supervisors, mathematicians, teacher educators, principals, school board members, and parents” (NCTM, 2007, p. 62). According to Schoenfeld (2004), “In the 1980s, the NSF did not dare to engage in the support of what might be seen as a potential national curriculum. To do so would risk the wrath of Congress.” (p. 260).

_A Nation at Risk: The Imperative for Education Reform_, published by the National Commission for Excellence in Education in 1983, resulted in the formation of projects to improve mathematics achievement. One such project, the Algebra Project, involved teaching algebra to seventh and eighth grade students by offering “a new curriculum and a five-step curricular process for sixth graders” (Moses et al., 1989, p. 424). In 1986, the first graduating class of the Algebra Project entered high school. Moses et al. (1989) reported that “39 percent of the graduates were placed in Honors Geometry or Honors Algebra” (p. 431). Movements such as the Algebra Project set the stage for state-level mathematics standards reform in the mid-1980s (Smith & O’Day, 1991).
The National Center on Education and the Economy (NCEE) was formed in 1988 to create a plan for education in America and provide educators with resources to implement the plan (NCEE, 2012). The NCEE was an outcome of the 1985 Carnegie Forum on Education and the Economy, which produced *A Nation Prepared: Teachers for the 21st Century*. Published in 1986, this report emphasized the need to improve education in the United States by means of high national standards (NCEE, 2012). Although the NCEE was not successful in forming nation-wide standards, the organization was successful in creating a certification program in 1987, the National Board for Professional Teaching Standards, which was and still is a nationally recognized ten-year teaching credential (NBPTS, 2012).

Adding to the reform movement, in 1985, the California Department of Education created the Mathematics Framework for California Public Schools, which “was considered a mathematically solid and progressive document, in many ways the antecedent of the 1989 NCTM Standards” (Schoenfeld, 2004, p. 271). Schoenfeld (2004) reported that book publishers capitalized on this framework by creating textbooks that supported California’s reforms. However, many parents viewed this new framework as degrading traditional mathematics.

These movements eventually led to a standards publication. Thomas Romberg and the board of directors at NCTM formed the Commission on Standards for School Mathematics in 1986 (Schoenfeld, 2004). NCTM president John Dossey then assembled a writing team in 1987 to begin work on a new standards publication called the *Curriculum and Evaluation Standards for School Mathematics*. The stated goals of this publication were “(1) that [students] learn to value mathematics, (2) that they become confident in their ability to do mathematics, (3) that they become mathematical problem solvers, (4) that they learn to communicate mathematically, and (5) that they learn to reason mathematically” (NCTM, 1989, p. 5). The *Curriculum and Evaluation Standards for School Mathematics* (1989) gave the public and educational community a comprehensive guide to the mathematics that should be taught from kindergarten through grade twelve.

With the publication of these standards in the 1990s, the math wars (Schoenfeld, 2004, p. 253) had officially begun. Traditionalists posited that we needed to “continue to do all that we have been doing and just to add on a little more that is new” (Leinwand, 2012, p. 21). In contrast, reformists felt that in order for mathematics education to move in a forward direction, it was necessary for a change to occur in mathematical content and pedagogical approaches (Leinwand, 2012; NCTM 1989). Leinwand (2012) claimed that “this needed role of preparing students for the future directly conflicts with the traditional role of schools” (p. 24).

The NCTM responded to the need for change in content and pedagogy by creating *Professional Standards for Teaching Mathematics* to complement the *Curriculum and Evaluation Standards* (NCTM, 1991). In this publication, stories and vignettes provide examples and mini-scripts as to how a teacher could approach teaching a mathematical concept (NCTM, 1991). However, assessment needed to be addressed, which led to another NCTM publication, *Assessment Standards for School Mathematics*. 
The Assessment Standards for School Mathematics resulted largely from a 1993 report, Measuring What Counts from the Mathematical Sciences Education Board (MSEB). There was a need to develop new assessments that matched the reforms endorsed by the NCTM. This publication focused on exploration and investigation, and teachers were encouraged to move from direct instruction to asking questions and listening to responses as well as assessing students using multiple sources and problems with real-world applications (NCTM, 1995).

During this time, battles between traditionalists and reformists were becoming more intense. One such battle arose with a sample test item for mathematics released from the California Learning Assessment System in 1994. In this sample, students providing a written explanation of the problem, but making an error in computation, scored higher than students making no computational errors (Schoenfeld, 2004).

The plethora of battles during the math wars led to the formation of committees within the NCTM such as the Commission on the Future of the Standards (CFS). The CFS produced a standards document in 1995 that would reflect mathematics standards for the year 2000 and beyond (NCTM, 2000). The collaboration of expert knowledge from teachers, administrators, researchers, professors of education, and mathematicians led to the formation of new standards that now had four categories: pre-kindergarten through grade two, grades three through five, grades six through eight, and grades nine through twelve. In addition, an electronic format group came together in 1997 and was responsible for using technology to enhance classroom lessons in mathematics, and an NCTM website became a part of the World Wide Web in September of 1996 (NCTM, 2007).

Another group of governors and leaders of corporations at a 1996 National Education Summit formed a non-profit group called Achieve (Achieve, 2012b). This group became immediately active by beginning a pilot project called the Academic Standards and Assessments Benchmarking Project in 1998 and sponsoring a National Education Summit in 1999 (Achieve, 2012a).

The 21st century arrived and along with it came the Principles and Standards for School Mathematics (2000). This publication contained examples for classroom use, student work samples, and stories that support the ideas emphasized in the document, which sought to improve the education of students in mathematics (NCTM, 2000). Shortly after this publication, the No Child Left Behind Act (NCLB) provided standards specific to the mathematics taught in grades three through grades eight (Linn, Baker, & Betebenner, 2002).

In October of 2004, the state of New Jersey adopted the Core Curriculum Content Standards (CCCS) with content areas that included mathematics as well as language arts literacy, science, social studies, and electives such as world languages and technological literacy. The stated vision of this document with respect to mathematics is “to enable all of New Jersey’s children to acquire the mathematical skills, understandings, and attitudes that they will need to be successful in their careers and daily lives” (NJDOE, 2004, p. 1). The New Jersey Mathematics Curriculum Framework “was developed to provide assistance and guidance to districts and teachers in how to implement these standards, in translating the vision into reality” (NJDOE, 2004, p. 5). The authors were Joseph G. Rosenstein, Janet
H. Caldwell, and Warren D. Crown, who credited the collaborative effort of the New Jersey Mathematics Coalition and the New Jersey Department of Education, as well as many other contributors.

In 2010, the CCSS were released, which gave teachers and students insight into the expectations of student learning in grades kindergarten through grade twelve (NGA Center & CCSSO, 2010b; Achieve, 2012b). Achieve had become a vital part of the CCSS implementation and in 2010 had teamed up with the Partnership for Assessment of Readiness for College and Careers (PARCC) to address new assessments for the 2014-2015 school year (Achieve, 2012b).

The aforementioned evolution of standards raises several questions. Should mathematics educators, like me, be concerned with the controversy surrounding the implementation of the CCSS? Being a twenty-four-year veteran teacher, should the implementation of the CCSS change my pedagogy? After all, the CCSS are “grade-specific standards” (NGA Center & CCSSO, 20101, p. 4) that do not specify pedagogy. Is it valid to claim the math wars have ended?

Steven Leinwand, a former president of the National Council of Supervisors of Mathematics (NCSM) supported this idea when he claimed “It is fair to argue that the Common Core State Standards for Mathematics’ most impressive contribution is that they have essentially ended the ‘math wars’ that have plagued school mathematics for much of the twenty years since the 1989 release of the NCTM Curriculum and Evaluation Standards” (2012, p. 3). Is it even possible for the CCSS to resolve the so-called math wars of the 1990s? Or has the implementation of the CCSS created a new debate? Only time will tell.

References


The Evolution of Mathematics Standards

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The Journal

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