Spring 5-17-2013

An Archaeological/Genealogical Historical Analysis of the National Council of Teachers of Mathematics Standards Documents

Erika C. Bullock
Georgia State University

Follow this and additional works at: https://scholarworks.gsu.edu/msit_diss

Recommended Citation
https://scholarworks.gsu.edu/msit_diss/110

This Dissertation is brought to you for free and open access by the Department of Middle-Secondary Education and Instructional Technology (no new uploads as of Jan. 2015) at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Middle-Secondary Education and Instructional Technology Dissertations by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact scholarworks@gsu.edu.
This dissertation, AN ARCHAEOLOGICAL/GENEALOGICAL HISTORICAL ANALYSIS OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS STANDARDS DOCUMENTS, by ERIKA CATHERINE BULLOCK, was prepared under the direction of the candidate’s Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Philosophy, in the College of Education, Georgia State University.

The Dissertation Advisory Committee and the student’s Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty. The Dean of the College of Education concurs.

David Stinson, Ph.D.
Committee Chair

Stephanie Behm-Cross, Ph.D.
Committee Member

Elizabeth DeFreitas, Ph.D.
Committee Member

Janice Fournillier, Ph.D.
Committee Member

Philo Hutcheson, Ph.D.
Committee Member

Pier Junor Clarke, Ph.D.
Committee Member

Date

Dana L. Fox, Ph.D.
Chairperson, Department of Middle-Secondary Education and Instructional Technology

Paul Alberto, Ph.D.
Interim Dean
College of Education
AUTHOR’S STATEMENT

By presenting this dissertation as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this dissertation may be granted by the professor under whose direction it was written, by the College of Education’s Director of Graduate Studies, or by me. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involved potential financial gain will not be allowed without my written permission.

_____________________________________________
Erika Catherine Bullock
NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University library must be used in accordance with the stipulations prescribed by the author in the preceding statement. The author of this dissertation is

Erika Catherine Bullock
5526 Somervale Court
Douglasville, GA 30134

The director of this dissertation is

Dr. David W. Stinson
Department of Middle-Secondary Education and Instructional Technology
College of Education
Georgia State University
Atlanta, GA 30303
CURRICULUM VITAE

Erika Catherine Bullock

ADDRESS: 5526 Somervale Court
Douglasville, GA 30134

EDUCATION:
Ph.D. 2013 Georgia State University
Teaching and Learning with a concentration in
Mathematics Education
M.Ed. 2008 Georgia State University
Mathematics Education
B.S. 2002 Spelman College
Computer Information Science

PROFESSIONAL EXPERIENCE:
2009–present Graduate Research Assistant
Georgia State University,
GA
2008–2010 Mathematics Teacher
McEachern High School, Cobb County School
System, GA
2005–2008 Mathematics Teacher
Cedar Grove High School, DeKalb County School
System, GA
2004–2005 Server Operations Specialist
Insight Global/Turner Broadcasting Systems,
GA
2003–2004 Technical Support Specialist
State Farm Insurance Company,
GA

PUBLICATIONS
question of methodology [Special issue]. Journal of Mathematics Education at
Teachers College, 3(2), 30–36.
postmodern theory in mathematics education research. In L. R. van Zoest, J. –J.
Lo, & J. L. Kratky (Eds.), Proceedings of the 34th annual meeting of the North
American Chapter of the International Group for the Psychology of Mathematics
Education (pp. 1163–1169). Kalamazoo, MI: Western Michigan University.
children in mathematics education: A response to a clarion call [Special issue].

PRESENTATIONS (selected)

HONORS AND AWARDS (selected)
Southern Regional Education Board Doctoral Scholars Program Dissertation Award; $20,000; submitted February 2012; awarded July 2012
Georgia State University College of Education Dean’s Doctoral Dissertation Award; $1,000; submitted March 2012; awarded April 2012
Georgia State University College of Education Department of Middle-Secondary Education and Instructional Technology Beverly J. Armento Doctoral Award; $1,000; submitted March 2012; awarded April 2012

PROFESSIONAL SOCIETIES AND ORGANIZATIONS (selected)
2009–present American Educational Research Association
2009–present Sisters of the Academy
2007–present Georgia Council of Teachers of Mathematics
2005–present National Council of Teachers of Mathematics
ABSTRACT

AN ARCHAEOLOGICAL/GENEALOGICAL HISTORICAL ANALYSIS OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS STANDARDS DOCUMENTS

by

Erika Catherine Bullock

Since the mid-20th century in the United States, there have been several reform movements within mathematics education; each movement has been subject to its own unique socio-cultural and -political forces. The National Council of Teachers of Mathematics’ (NCTM) Standards documents—Curriculum and Evaluation Standards for School Mathematics (1989), Professional Standards for Teaching Mathematics (1991), Assessment Standards for School Mathematics (1995), and Principles and Standards for School Mathematics (2000)—not only represent the most recent of these reform movements but also the most enduring. Collectively, these documents have formed a discourse (cf. Foucault, 1969/1972)—Standards-based mathematics education—that has guided mathematics education through the 1990s and beyond. This study uses Foucaultian archaeological and genealogical methods (cf. Foucault, 1969/1972, 1975/1995) to explore Standards-based mathematics education as a “discursive formation” (Foucault, 1969/1972) and the complex power relations (cf. Foucault, 1976/1990) that made it possible for the formation to become The discourse of school mathematics, making others impossible. Data for the exploration includes the Standards documents, earlier histories of the NCTM Standards moment, scholarly and policy literature surrounding the NCTM documents, and oral history interviews with several of the writers of the NCTM documents. The study presents a historical narrative of mathematics education in the 20th century that both contextualizes Standards-based
mathematics education and problematizes NCTM’s efforts; a key focus is the strategy that NCTM deployed to maintain the viability of *Standards*-based mathematics education as a discourse. Foucault’s (1984) “author function” is used to address the ways that the writers, externalities, and NCTM as an organization “authored” the *Standards* documents. The study concludes arguing that perpetuating the discursive formation of *Standards*-based mathematics education is neither good nor bad but only dangerous; therefore, it requires mathematics educators to maintain a sense of pessimistic activism related to present and future reform efforts (cf. Foucault, 1983/1997).
AN ARCHAEOLOGICAL/GENEALOGICAL HISTORICAL ANALYSIS OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS STANDARDS DOCUMENTS

by

Erika Catherine Bullock

A Dissertation

Presented in Partial Fulfillment of Requirements for the Degree of Doctor of Philosophy in Teaching and Learning in the Department of Middle-Secondary Education and Instructional Technology in the College of Education Georgia State University

Atlanta, GA 2013
ACKNOWLEDGMENTS

To my Lord and Savior Jesus Christ: Thank you for causing all things to work together for good. You have shown your faithfulness at every turn. I am grateful for the love, peace, grace, mercy, and wisdom that you have given me so freely.

To my grandparents, James and Jacquelyn Trimm: My only wish is that you could have been here to witness this moment. Thank you for being fine examples of educators. I dedicate this and all of my work to you; I hope that I will walk worthy of the legacy that you left for me.

To my parents, Walter and Valerie Bullock: Thank you for your perpetual love and support. No matter how rough the road and how crazy my decisions may have seemed, you have trusted and encouraged me. I am forever grateful.

To my family and friends: I have been blessed with an incredible family and dear friends. Thank you for every call, card, meal, thought, prayer, and venting session. My life is much richer because of you.

To Dr. Gwen Benson: Thank you for supporting me and for providing the space for such a tremendous experience. Having you as a cheerleader is a true blessing.

To the Southern Regional Education Board: Thank you for the Doctoral Dissertation Award that allowed me the freedom to write and think.

To Jay, Jackie, Christopher, Nathan, Maisie, Tene, Demetricia, Adrienne, Crystal, Chike, Garfield, Anthony, Brandon, Sarah, Teri, and everyone who read drafts, talked through ideas, or listened to my (in)coherent ramblings: Engaging with each of you has helped me to conceptualize who I am as a scholar. Thank you for lending your strengths to me and for allowing me to serve you with mine.

To my major professor, Dr. David Stinson: Thank you for planting the PhD seed in my mind and for nurturing it over these years. You have taught me so much. Thank you for always believing in me (sometimes more than I believed in myself) and for allowing me the space to become my own scholar.

To my dissertation committee: I appreciate the commitment that each of you made to my work and me. Each of you has made an indelible imprint on me both as a person and as a researcher. Thank you for treating my work with great care and for helping me to present a product of which I can be proud. I have learned much from each of you.

To every scholar (young and seasoned) that I have met along the way in person and in print: Your have helped me to find myself and lose myself over and over. Thank you for releasing a piece of yourself into the world for me to pick up, play with, turn over, throw away, and pick up again.

Finally, to the narrators in this study: Thank you for sharing your stories, experiences, and thoughts with me. It was an honor to work with you.
# TABLE OF CONTENTS

**Chapter**

1. **INTRODUCTION** .......................................................... 1
   Why Historical Inquiry? .................................................. 4
   Mathematics Education as a Historical Product .................. 7
   Previous Historical Work .............................................. 9
   Summary and Conclusion ............................................... 11

2. **FOUCAULT’S CONCEPTS** ............................................. 13
   Defining Postmodernism .............................................. 13
   Theoretical Concepts .................................................. 15
   Methodological Concepts ............................................. 26
   Summary and Conclusion ............................................. 41

3. **METHODOLOGICAL ASSEMBLAGE** ................................ 43
   Data .............................................................................. 44
   Reading to Get to Writing ............................................. 61
   Additional Analytical Strategies .................................... 66
   Data Reporting and Representation ................................ 67
   Summary and Conclusion ............................................. 68

4. **SETTING UP THE STANDARDS** .................................... 70
   The Challenge of Public Education: Progressive vs. Academic Mathematics ..... 71
   Mathematics Education Emerges: Mathematicians vs. Mathematics Educators... 75
   Reconsidering the *Sputnik* Effect ................................... 79
   New Math ...................................................................... 82
   Back to Basics ................................................................ 83
   Paving the Road to *Standards* ....................................... 84
   Summary and Conclusion ............................................. 95

5. **THE STANDARDS DOCUMENTS** .................................... 97
   *Curriculum and Evaluation Standards for School Mathematics (CESSM)* ...... 101
   *Professional Standards for Teaching Mathematics (PSTM)* .................. 121
   *Assessment Standards for School Mathematics (ASSM)* ..................... 127
   Lost Documents ................................................................ 134
   *Principles and Standards for School Mathematics (PSSM)* .................... 137
   Summary and Conclusion ............................................. 161

6. **AUTHORING MONUMENTS** ......................................... 163
   The Author Function .................................................... 163
   The Writers as Authors ................................................ 166
<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Externalities as Authors</td>
<td>170</td>
</tr>
<tr>
<td>The 26th Participant: NCTM as Author</td>
<td>176</td>
</tr>
<tr>
<td>Summary and Conclusion</td>
<td>197</td>
</tr>
<tr>
<td>7 RECAPITULATION AND CONCLUSION</td>
<td>199</td>
</tr>
<tr>
<td>What Remains Unsaid</td>
<td>202</td>
</tr>
<tr>
<td>Pessimistic Activism</td>
<td>204</td>
</tr>
<tr>
<td>AFTERWORD: A LETTER TO THE NARRATORS</td>
<td>206</td>
</tr>
<tr>
<td>References</td>
<td>208</td>
</tr>
<tr>
<td>Appendixes</td>
<td>239</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>AMA</td>
<td>American Mathematical Association</td>
</tr>
<tr>
<td>AMATYC</td>
<td>American Mathematical Association of Two-Year Colleges</td>
</tr>
<tr>
<td>AMS</td>
<td>American Mathematical Society</td>
</tr>
<tr>
<td>ARG</td>
<td>Association Resource Group</td>
</tr>
<tr>
<td>ASSM</td>
<td>Assessment Standards for School Mathematics</td>
</tr>
<tr>
<td>CCSS</td>
<td>Common Core State Standards</td>
</tr>
<tr>
<td>CCSS-M</td>
<td>Common Core State Standards for Mathematics</td>
</tr>
<tr>
<td>CESSM</td>
<td>Curriculum and Evaluation Standards for School Mathematics</td>
</tr>
<tr>
<td>MAA</td>
<td>Mathematical Association of America</td>
</tr>
<tr>
<td>MSEB</td>
<td>Mathematical Sciences Education Board</td>
</tr>
<tr>
<td>NCSM</td>
<td>National Council of Supervisors of Mathematics</td>
</tr>
<tr>
<td>NCTM</td>
<td>National Council of Teachers of Mathematics</td>
</tr>
<tr>
<td>NEA</td>
<td>National Education Association</td>
</tr>
<tr>
<td>NSF</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>PRISM</td>
<td>Priorities in School Mathematics</td>
</tr>
<tr>
<td>PSSM</td>
<td>Principles and Standards for School Mathematics</td>
</tr>
<tr>
<td>PSTM</td>
<td>Professional Standards for Teaching Mathematics</td>
</tr>
<tr>
<td>RAC</td>
<td>Research Advisory Committee of the National Council of Teachers of Mathematics</td>
</tr>
<tr>
<td>SIRG</td>
<td>Standards Impact Research Group</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

I know I have presented you with a lot of information today, but just remember one thing: in this district, all of our math classes are standards-based. That’s what I expect to see.

I stared blankly at the district mathematics coordinator who held the microphone, wondering if anyone else in the room full of teachers new to the district felt as clueless as I did. Clearly the coordinator had issued a stern directive regarding what she expected to see as she conducted periodic classroom observations, but there was one problem: I had no idea what “standards-based” meant.

After a corporate layoff, I decided to teach for a while until I could return to a “real” job. My transcript indicated that my undergraduate degree in computer science gave me nearly all of the mathematics required to work as a high school mathematics teacher. I enrolled in an alternative preparation program that allowed me to pursue full certification in the evenings while simultaneous working as the teacher-of-record in a high school mathematics classroom. The program seemed perfect, but there was the small matter of the nearly 100 students that I would be responsible for teaching each day. I could do mathematics, but could I teach it? I knew nothing of pedagogy and had no access to the vocabulary or endless acronyms of education; hence the blankness of my stare when my new superior told me (she was not speaking directly to me, but it surely felt that way) that she would expect my classroom to be standards-based.

I asked some questions and the mathematics coordinator directed me to

Implementing Standards-Based Mathematics Instruction: A Casebook for Professional
Development’ (Stein, Smith, Henningsen, & Silver, 2000), a book of cases that represent “research-based pattern[s] of teaching and learning” (p. 5). Unfortunately, the book was not very helpful. I did not have the foundational pedagogical understanding required to implement the book’s suggestions. I was not in the position to receive what the cases offered because each day in the classroom was a struggle to stay afloat.

In spite of my own ignorance, I made it through the first years and came to feel at home in the classroom. Although it was still unclear to me what a standards-based classroom was, my observations were always positive. I was selected to conduct professional development for other mathematics teachers alongside the same mathematics coordinator, so I must have been doing something right in spite of my little secret. But I kept asking. I looked to celebrated mathematics teachers and analyzed their practice. They were all quite different and all approach the idea of the standards-based classroom differently. Some exclusively used group work while others embraced project-based learning. Some designed games and wrote songs while others spent hundreds of dollars on activity guides and ancillary materials. Some even put students on websites during class hoping for credit for technology integration. Although I asked questions and remained curious, I still did not know what I was supposed to do.

I later encountered Stein and colleagues’ (2000) casebook in a graduate pedagogy course. During that course, I finally began to understand what had eluded me for several years. The classroom environment that the mathematics coordinator charged me to create was one where students engaged in “meaningful mathematical tasks” of “high cognitive

---

1 Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development was published by Teachers College Press and also bears the imprint of the National Council of Teachers of Mathematics (NCTM).
demand.” In her observations, the coordinator was looking for opportunities for students to learn mathematics through “procedures with connections to understanding, meaning, or concepts” (Stein et al., 2000, p. 12). I also learned that what she expected was not standards-based, but rather Standards-based. What is the difference? The former may or may not exist; that is a debate for another forum. The latter, however, is based on the National Council of Teachers of Mathematics’ (NCTM) Standards documents.

Now, in hindsight, I call the mathematics coordinator’s expectations “Standards-based mathematics education.” I use this phrase to describe the perspective of school mathematics that became prevalent with the publication and dissemination of the NCTM Standards documents. My use of the term Standards aligns with Hiebert (1999):

> The phrase “NCTM Standards” or just “Standards” (capitalized [and italicized in this study]) will be used for the National Council of Teachers of Mathematics recommendations for K–12 curriculum, teaching, and assessment contained in the initial three-volume set (Curriculum and Evaluation Standards for School Mathematics [1989], Professional Standards for Teaching Mathematics [1991], and Assessment Standards for School Mathematics [1995]) and in the revised volume Principles and Standards for School Mathematics (draft, 1998) [published in 2000], all published in Reston, VA by the NCTM. (p. 3)

These documents have shaped mathematics education in the United States through the 1990s, the 2000s, and their residue remains in the 2010s. Bossé (2007) describes the Standards movement as particularly significant among other mathematics education reform movements of the late 20th century:

> Efforts to reform and counter-reform mathematics education have punctuated the history of the United States over the past four decades. Few movements, however, have had the profound and enduring effects as the NCTM Standards and its accompanying and historical documents (1980–1996) and the subsequent rewriting of the Standards known as the NCTM Principles and Standards for School Mathematics. (p. 1)
As the mathematics education community attempts to locate, if possible, “what works” in mathematics education in the United States, these “profound and enduring effects” make the *Standards* movement ripe for investigation (Bosse, 2007).  

*Standards*-based mathematics education, as a discourse, takes the *Standards* documents beyond the sphere of their publication into a realm that has shaped what mathematics is taught in schools, how it is taught, how it is assessed, how it is researched, how those who teach it are trained, and how the textbooks look. In this study, I use historical inquiry to consider how *Standards*-based mathematics education has become a prevailing discourse in mathematics education. I use Foucault’s archaeology and genealogy from a postmodern perspective to dig beneath the *Standards* documents. The documents, therefore, provide a backdrop to my inquiry as I use oral history interviews with some of the documents’ writers along with responsive scholarly publications to uncover how *Standards*-based mathematics education emerged as a discourse and became the dominant discourse within mathematics education that defined what was “right” for school mathematics.  

**Why Historical Inquiry?**  

Some may question my choice to invest this time looking backward when there is so much to be done moving forward. Mathematics education is replete with issues

---

2 I use several terms in this introduction such as *discourse* and *power* that have rather common meanings. However, the ways in which I use them come from a Foucaultian postmodern theoretical position differs from these common understandings. I explicate these concepts in the following chapter.

3 I use the phrase “school mathematics” to describe the system of mathematics education in schools, which includes curriculum, teaching, and assessment. In a sense, this phrase is interchangeable with mathematics education in this study. I do recognize, however, that although mathematics education is largely recognized as school mathematics, it occurs equally in out-of-school contexts.
worthy of investigation. The most recent challenge to my choice came from a well-meaning researcher who suggested that, as a Black woman, I should spend my time looking at issues related to Black children, particularly equity issues. My thoughts about the dissertation have not drawn me in that direction, but not because I do not care about those issues or Black children. On the contrary, they are often first on my mind, but I believe that I have a responsibility to use research as a tool to ask new questions and to ask old questions in new ways (Bullock, 2012; Stinson & Bullock, 2012). Valero (2012) discusses mathematics education as a discipline that encompasses a “network of mathematics education practices”:

> Sites of practice such as international or national educational policy making in mathematics, teacher education, textbook production, the labor market, and even the very same research on all these practices [and, I would add, the history of these practices], among others, are part of the practices of mathematics education. (p. 374)

I, like Valero, believe that addressing equity, or any other issue within mathematics education, requires research that touches all parts of the network of mathematics education practices (Bullock, 2012). It is insufficient, for example, to address equity only from the perspective of classroom instructional practices when there are a myriad of factors that affect equity. In this project, I shift the site of research to history, curriculum, and policy in an effort to develop an understanding of the history of Standards in mathematics education. This understanding may contribute to how we see other issues within mathematics education, but that extended reach is beyond the scope of this study.

My statements may seem dismissive of critiques based on the immediate needs in mathematics classrooms, but I have appreciated, welcomed, and shared these critiques during this process more often than I would care to admit. As a result, I have engaged
frequently in a series of internal theoretical battles. If I assume the postmodern position that constructing a history is writing a fiction based upon a reality that cannot be represented (Brown, 2005), then what is the point? What does such a history offer? As I write, the postmodernist on my left shoulder screams, “Why should there be a point? Why does there always have to be a benefit?” while the critical theorist on the right responds, “Because there are teachers and kids who are drowning!” It would be dishonest of me to deny that I hold some “conviction that History\(^4\) as a subject [can] assist in understanding the contemporary human condition by its ability to inform applied subjects” (Brown, 2005, p. 20) such as mathematics education.

Brown (2005) states, “the agenda for historical study is always being set by where we are now—by our current ideological, political, social, or other concerns” (p. 29). Within mathematics education, the most pressing present concern is the transition to the Common Core State Standards for Mathematics (CCSS-M).\(^5\) Although the CCSS-M is not the backdrop of this investigation, it does set the agenda for my participants in their reflections upon the Standards movement and for myself as I have approached this project. As I listened, read, thought, and wrote, I continually wondered what this history can tell us—the mathematics education community—about where we are and where we are going. Parks (2009) offers some insight: “What we accept as known today is also a product of the ways that power has been exercised in the past” (p. 15). As we consider the notion of Standards-based mathematics education as “what works” in mathematics

---

\(^4\) In the introduction to Postmodernism for Historians, Brown (2005) differentiates between “History (the subject with a capital ‘H’)...[and] history (the past with a small ‘h’)” (p. 1). While I understand this distinction, I do not ascribe to it personally. I distinguish between the two when quoting Brown’s work directly, but do not otherwise.

\(^5\) [http://www.corestandards.org](http://www.corestandards.org)
education, we must consider the past plays of power that have caused Standards-based mathematics education to become the prevailing discourse within mathematics education. Through this historical inquiry, I uncover some of these hidden power relations to discuss how the Standards have become the prevailing discourse within mathematics education. If nothing more, I believe that this project gives us a new and different basis on which to critically examine the history of mathematics education, mathematics education’s current position with the CCSS, and any curriculum changes that follow.

**Mathematics Education as a Historical Product**

Can we discover who we are through history? Perhaps. At the very least, we can learn more about how we have come to the place in which we find ourselves and which winds have pushed our sails toward this moment. What, then, is the benefit of historical inquiry? Reese’s (2003) assertion that “history serves many masters” (p. 4) leads me to believe that there is something of value here for all of us as mathematics educators. As a social scientist that uses historiographical methods,⁶ I fight two urges in this writing. The first is that urge to make some grand romantic statement about the Standards movement and its footprint in United States education. The second urge pushes me toward closing this project with a set of lessons to be learned from the Standards movement. There is no such lesson. As author, I cannot control the lessons that you, the reader, find within these pages. It may be easy to see this story as evidence of NCTM’s (unintended?) complicity in the turn toward standardization and accountability that has overtaken U.S. education. We could also long for the “good old days” of mathematics education before the

---

⁶ Historiography refers to the “trade” methods of conducting historical research; e.g., archival research, oral history and life history interviewing (Barzun & Graff, 2004; Danto, 2008; Gilderhus, 2010).
Standards, but we must look critically at our own nostalgia and question whether the old days were as good as we recall.

As I write, I feel like I am trying to maintain an exercise of avoidance—in a sincere effort to avoid offense or undue implication, I am careful to avoid strong statements related to any single position. To the contrary, the care that I take is meant to avoid the construction of a Master Narrative. There is, however, something that I hope the reader will leave this project with: a sense of how NCTM and the discipline of mathematics education have changed over time. William Speer, a narrator in this study, described the Standards as “snapshots in time using a variety of cameras.” Historical research allows us to examine these snapshots in a way that no other mode of inquiry can (Reese, 2003). I hope that you see how discourses surrounding mathematics, curriculum, teaching, and policy have shifted, while understanding that this historical inquiry also resides within a shifting discursive moment (Reese, 2003).

Although I am unable to uncover the Truth of the Standards movement in U.S. mathematics education—a definitive capital “T” truth does not exist—there is value in entertaining the facts and events of the Standards movement. There is more here than just a story. According to Popkewitz (2009), standards “order the practices of curriculum and teaching.” He continues:

These rules and standards are historically produced, and function as cultural theses about how the child is, and should live. To talk about the child as, for example, a ‘problem- solver’ or as ‘disadvantaged’ invokes not merely categories to help children become better and more successful. These categories embody particular principles about what is seen, thought about, and acted on in schooling. The ‘political’ of schooling lies here: in the shaping and fashioning of what is (im)possible. The ‘reason’ of

---

7 Again, I define my approach to discourse in the following chapter.
schooling embodies a style of comparative thought that differentiates, distinguishes, and divides. (p. 303)

Investigating the Standards and, by extension, mathematics education as a historical product uncovers that which is hidden by our focus on locating “what works in the classroom” (Schoenfeld, 2000, p. 642). We often neglect to acknowledge that, enshrouded within the history of mathematics education, are clues that, while they may not tell us what works, can lead us to a better understanding of why, like Israel, “[we] have stayed long enough at this mountain” (Deuteronomy 1:6 New International Version).

**Previous Historical Work**

There have been seminal works chronicling the history of mathematics education (e.g., NCTM, 1970; Stanic, 2007; Stanic & Kilpatrick, 1992; 2003b; 2003c), mathematics education research (Kilpatrick, 1992), mathematics curricula, and issues in mathematics education (Klein, 2007; Schubring, 2006). Although many have addressed the Standards movement from different perspectives, the most comprehensive work chronicling the history of the Standards movement in mathematics education was conducted by Douglas McLeod, Emeritus Professor of Mathematics at San Diego State University, and colleagues (McLeod, 2003; McLeod, Stake, Schappelle, Mellissinos, & Gierl, 1996).

McLeod and colleagues (2003; McLeod et al., 1996) chronicled the Standards movement as it happened. His work, as does mine, includes interviews with several mathematics educators who led the Standards movement, participated in the construction of the NCTM documents, and worked to infuse the ideas of Standards-based mathematics education. McLeod became the unofficial historian of the Standards movement by taking the lead in a three-year case study of the NCTM’s efforts in writing
and disseminating the CESSM, PSTM, and ASSM. This study was part of the Bold Ventures project, a 3-volume study of eight innovations in United States mathematics and science education supported equally by the United States Department of Education (USDOE) and National Science Foundation (NSF) (Raizen & Britton, 1996). Raizen (1996) summarizes McLeod and colleagues’ case study in the introduction to the volume: “The case study tells the story of how a professional organization of mathematics teachers assumed national leadership in the field of mathematics education and influenced national and state policy in the movement to develop high educational standards” (p. 3). The studies within the Bold Ventures project were presented as case studies rather than histories: “each of the case reports documents a ‘work in progress’—the situation and context as they were observed and recorded during a specific year in the life of each project” (p. 8). Although the Bold Ventures report was not a history, McLeod’s (2003) later contribution to Stanic and Kilpatrick’s (2003b) two-volume work A History of School Mathematics clearly was.

McLeod and colleagues’ (McLeod, 2003; McLeod et al., 1996) studies, although comprehensive, do not offer the reader any significant methodological insight. The only nod toward methodology is written as a footnote to the first quote in the Bold Ventures study: “Quotations were usually taken from transcripts of interviews with sources; some sources provided written responses. We identify sources by name with their permission” (McLeod et al., 1996, p. 15). Of the four members of the Bold Ventures research team, two—Robert Stake, a professor at the University of Illinois, and Mark Gierl, a doctoral student in measurement and evaluation—were research methodologists with no explicit background in mathematics education (McLeod et al., 1996). Based upon Stake’s
publication record, it would seem that his role on the research team was to provide methodological guidance (Stake, 1995; 2005).

**Summary and Conclusion**

As a teacher, I found myself unwittingly subjected to a set of expectations that I did not understand and those around me were unable to articulate. As I began to understand that these expectations were based on recommendations from the *Standards* documents, it became apparent that these documents were more than volumes sitting untouched on bookshelves or abandoned by retired mathematics teachers in the bottom of closets.\(^8\) In this study, I argue that these documents actually created a discourse by which mathematics education was governed. I use Foucault’s archaeology and genealogy from a postmodern perspective to examine how the documents came to be and how they came to become the arbiter of what is “right” in mathematics education. In the next chapter, I describe some of Foucault’s theoretical and methodological concepts that guided this study. In Chapter 3, I discuss my methodological approach to the study, addressing how I collected, analyzed, and represented the data. Chapters 4 and 5 contain a historical narrative of the *Standards* movement based upon the data collected. In Chapter 6, I analyze the relations of power present in the narrative of the *Standards* movement as presented and outline how *Standards*-based mathematics education became a sustained discourse. Finally, in Chapter 7, I conclude the study with a summary, some

---

\(^8\) The first time that I held one of the *Standards* documents was in my third year of teaching. When I moved to a new classroom, I found *Principles and Standards for School Mathematics* (NCTM, 2000) at the bottom of a closet in the back of the room. The name on the book’s spine indicated that it belonged to a teacher who had retired several years before.
considerations for future research and a challenge to the mathematics education community to maintain a stance of “pessimistic activism” (Foucault, 1983, p. 232).
CHAPTER 2

FOUCAULT’S CONCEPTS

The methodological background for this study is based on Foucault’s archaeology and genealogy. It is insufficient, however, to enter into this methodological discussion without first addressing the theoretical underpinnings for the methodology. In this case, genealogy is based upon a postmodern theoretical framework and, more specifically, on a Foucaultian postmodernism. Although there are other significant figures within postmodern thought (e.g., Judith Butler, Jacques Derrida, Gilles Deleuze, Felix Guattari, Luce Irigaray, Jean-François Lyotard), I focus my use of postmodernism on Michel Foucault’s work.

In this chapter, I begin with a general discussion of postmodernism. Then, I introduce Foucault as a postmodern thinker and historian, discussing his position on history and more traditional historians’ opinions of his work. I follow this discussion by outlining several foundational Foucaultian concepts. Finally, I finish the chapter with an introduction to archaeology and genealogy and a discussion of how the two work together.

Defining Postmodernism

Before I move forward, I must clarify my use of the term postmodernism. The words postmodern and poststructural are often used interchangeably (Kincheloe & McLaren, 1994; Schwandt, 2001). I, too, often use them without distinction. Denzin and

---

9 This term can also be spelled Foucauldian. Different critics and commentators use different spellings. In some cases, the same scholar has used each of the spellings in different works (e.g., see St. Pierre 2000; 2011). I have not been able to locate an explanation for either spelling, so I have chosen to use Foucaultian because it is closest to Foucault’s name.
Lincoln (1994) characterize poststructuralism as a perspective in which “language is an unstable system of referents, thus it is impossible ever to capture completely the meaning of an action, text, or intention” (p. 15). They continue to define postmodernism as “a contemporary sensibility, developing since World War II, that privileges no single authority, method, or paradigm” (p. 15). According to this definition of postmodernism, there is no privilege assigned to the authority of language. It is based on this distinction that I use postmodernism as an “umbrella term...that includes poststructuralist currents” (Kincheloe & McLaren, 1994, p. 143) for both postmodernism and poststructuralism (Schwandt, 2001).

I write with full awareness that “as soon as [I] say ‘the postmodern is’ [I] give it a fixed and definitive ontology and identity” (Usher & Edwards, 1994, p. 7). This awareness is a direct result of the resistance to definition within postmodern thought. It is for this reason that I struck through the word ‘defining’ in the heading above. By striking through the word, I place it “under erasure” (Derrida, 1974/1997, p. 60) “in the acknowledgement that it is one of those impossible things that we cannot do without” (Burman & MacLure, 2005, p. 286). The ability to define or name a thing is a position that allows one power over that which she defines or names. A definition is a boundary that, perhaps most significantly, concretizes what the thing is not. Postmodernism resists such boundaries by “[offering] theoretical pathways that move beyond the Cartesian self in order to account for the merging of the social, discursive, temporal, spatial, and the psychic” (Walshaw, 2011, p. 8). It is a challenge, therefore, to articulate a postmodern

---

10 The “Cartesian self” refers to René Descartes’ Cartesian dualism. Cartesian dualism is often described as a “mind-body split” or “mind-body dualism.” The central question of Cartesian dualism is “What connects the mind and brain?” (McLaughlin, 1999, p. 684).
perspective when “the very notion of a postmodern perspective is problematic” (Usher & Edwards, 1994, p. 1).

Walshaw (2011) describes postmodernism as “a new attitude...[that] offers new resources to help us understand an increasingly complex, plural, and uncertain world” (p. 9). As an attitude, postmodernism allows me to theorize in my own way without laying a fixed claim to a single theoretical position. Like a bricoleur (Lévi-Strauss, 1962), I can pick up and put down theoretical tools as needed to serve my present need (Stinson & Bullock, 2012). Postmodernism also allows me to operate from a rather personal position of confidence that I have reached in this doctoral process: I am a complex person who lives a complex life. It is perfectly acceptable for me not only to embrace that complexity personally but also to allow it to resonate within my research. Postmodern theory allows me to address those complexities and to move in and out of theoretical positions as needed while simultaneously questioning my position within the postmodern project.

**Theoretical Concepts**

The bounty of literature written by and about Foucault would allow me to write endlessly about his work. Here, I address several concepts that are central to this study and that form the basis for the methodological decisions that I have made throughout. In this study, I use both archaeology and genealogy as complementary methodologies (Walls, 2009), which are discussed later in this chapter. Before moving into the

Descartes’s position was that there is a bidirectional causal relationship between the mental (mind) and the physical (body or brain); he doubted the existence of the senses (Shilling, 2001). The Cartesian self is a singular and complete individual that is the center of the universe (McLaughlin, 1999), leaving no room for that which cannot be conceived by the mind (Shilling, 2001).
discussion of these methodologies individually and their use in this study, I first address Foucault’s conceptualizations of the statement, discourse, power, and knowledge as the conceptual foundations of both methodologies (Sluga, 1985).

Statement

In his study of discourse, Foucault considers the uniqueness of statements to be his central theme (Foucault, 1969/1972a). For Foucault, a statement is not simply a speech act; it is far more inclusive (Blair, 1987; Dreyfus & Rabinow, 1983); a statement is the event of history:

However banal it is, however unimportant its consequences may seem, however quickly it is forgotten after its appearance, however little understood or badly deciphered one would think it, however quickly it may be devoured by the night, a statement is always an event that neither language nor meaning can completely exhaust. (Foucault, 1968/1994a, p. 308)

He offers three reasons why a statement is a peculiar type of event. First, a statement, while manifest through an act of speech or writing, “opens for itself the residual existence in the field or a memory or in the materiality of manuscripts, books, and any other form of record” (p. 308). In other words, the event of a statement lives beyond the act to be recalled through both physical and documentary memory. The second point of uniqueness is that a statement, through these forms of memory, “is open to repetition, transformation, and reactivation” (p. 308). An event can be retold, but never re-experienced. On the contrary, a statement can be reconstituted with a newness that the historical event cannot. Finally, a statement’s context is different from that of an event because a statement “is linked both to the situations that give rise to it, and to the consequences it gives rise to, but also at the same time and in quite another modality, to the statements that precede it and follow it” (p. 308). Thus, statements are not only part...
of a context of events but also one of statements. A statement’s context, therefore, includes not only the socio-historical, -cultural, and –political elements, but also the combination of those statements that make it possible (and impossible) and those that it makes possible (and impossible).

**Discourse**

A statement is the linking element of language and discourse. Language, as “a finite ensemble of rules which authorizes an infinite number of statements” (Foucault, 1968/1994a, p. 306), allows for the material construction of statements. Even ancient or “dead” languages retain the possibility for infinite statements if we can assemble their vocabularies and rules of formation. Discourse moves beyond language to assemble statements in an “always infinite and temporally limited ensemble” (Foucault, 1968/1994a, p. 307)

In education, the term “discourse” most often refers to talk. This linguistic approach to discourse follows a Sassurean semiotic model in which language is a system of signs and referents and meaning lies in the relations among them (Chandler, 2002; Grbich, 2007; St. Pierre, 2000; Walshaw, 2007). In his use of discourse, Foucault (1969/1972a) moves beyond signification:

> Of course, discourses are composed of signs; but what they do is more than use these signs to designate things. It is this *more* that renders them irreducible to the language (*langue*) and to speech. It is that ‘more’ that we must reveal and describe. (p. 49)

The “more” that Foucault alludes to includes what is spoken, written, thought, and enacted, as well as what is silent, unthought, or unactionable (Britzman, 2003; Johannesson, 1998; Mills, 2004; Usher & Edwards, 1994; Walshaw, 2007). The term “has come to be used to embody both the formal system of signs *and* the social practices
which govern their use” (Codd, 1988, p. 242). Foucault describes discourse as “a system of possibility which makes a field of knowledge possible [and impossible]” (Usher & Edwards, 1994, p. 90). This system includes the codes, mores, traditions, taboos, and habits of language that we accept in our daily lives. Foucault finds the approach to discourse as the reflection between signs and referents to be insufficient. Rather, his discourse constructs and constitutes these relations (Foucault, 1969/1972a). It is through discourse that we learn the possibilities [and impossibilities] for thought, speech, and action under particular socio-political and—historical conditions.

Foucault positions discourse as a structure with limited revisability (West, 1999) from which we cannot easily escape because it forms us as subjects (Foucault, 1971/1972b). According to St. Pierre (2000), “the rules of discourse allow certain people to be subjects of statements and others to be objects. Who gets to speak? Who is spoken? ...It organizes a way of thinking into a way of acting in the world” (p. 485). It is through discourse, for example, that I constitute myself as Black, female, or a teacher. Each of these labels—individually and in combination—carries with it behavioral norms and expectations of what I can and cannot say, think, wear, desire, or do. Some of these norms are taught (i.e., “Black people have to work twice as hard to be considered half as good.”), while others seem to be inherent (i.e., “Teachers are patient.”). I have both consciously and subconsciously subscribed to and been inscribed by these and other expectations because, despite the prevailing and permeating nature of such discourses, they are not easy to locate because they are taken as given; “it is an ‘unthought’” (Usher & Edwards, 1994, p. 90). Functioning within discourse becomes second nature and, therefore, “it is difficult to think and act outside it” (St. Pierre, 2000, p. 485). As I have
begun to question, however, my desire to resist is met with a sobering realization that I do not know how to work against what is so deeply entrenched. Usher and Edwards (1994) speak to the core of this challenge, asserting that, “discourse... ‘speaks’ but is yet silent—it is an absent presence, yet a powerful one” (p. 90). Although we exist in and are surrounded by various discourses, we often remain unaware of their effects. For this reason, discourse often operates without critique.

Although discourses often function in ways that are not obvious, their boundaries are clear. Discourse is governed by rules of exclusion (Foucault, 1971/1972b) that establish what is (im)possible, (un)speakable, and (un)thinkable. Without such rules, the discourse would not function. Due to these rules, there is not “majestically unfolding manifestation of a thinking, knowing, speaking subject” (Foucault, 1969/1972a, p. 55). Rather, the discourse strategically defines “various statuses, various sites, various positions that subject can occupy” (Sluga, 1985, p. 407).

The rules that act as boundaries of discourse allow statements to form and accumulate. Foucault was very interested in how statements accumulate. “Statements accumulate in various ways; they appear, are read or heard, sometimes repeated, often lost or ignored, preserved as a part of an archive, occasionally revived or rediscovered, appropriated for a new purpose, and so forth” (Blair, 1987, p. 370). Discourse is one form of statement accumulation in which statements “appear, are read or heard, sometimes repeated, [and are] often lost or ignored” (p. 370).

**Archive**

An archive, another form of statement accumulation, is discourse, but not in its active form. Rather, an archive refers to “the series of rules which determine in a culture
the appearance and disappearance of statements, their retention and their destruction” (Foucault, 1968/1994a, p. 309). In The Archaeology of Knowledge, Foucault (1969/1972a) defines an archive as “the general system of the formation and transformation of statements” (p. 130). In short, an archive is a sort of record of how discourse changes over time as evident through the appearance and disappearance of statements.

Nevertheless, it is important to note that the appearance and disappearance of statements does not imply a specific moment in which discourse opens or closes. In fact, the use of these words, combined with the notion of closure that historical distance provides, can be misleading. It is more appropriate to consider statements as being formed and transformed because this approach leaves the statements open to be taken up again. Thus, there is always a possibility that the statement can appear in other discourses or in other discursive moments (Flynn, 2005). Metaphorically, the archive is a snapshot of a dynamic discourse in a given moment of its existence. This snapshot shows “the system of [the discourse’s] functioning” (Foucault, 1969/1972a, p. 129) in that moment. Although the discourse may shift and statements may move to the background, they do not disappear; there is always a possibility of enunciation as long as the conditions for the enunciation, as maintained in the archive, are met.

Because the archive includes rules for both the formation and transformation of statements, the archival “snapshot” must occur at some point after a shift from one discursive moment to another. There is the need, therefore, for some time to pass before attempting to analyze the archive, or, extending the metaphor, for the photo to develop.
Foucault (1969/1972a) admonishes that, although it is impossible to describe the totality of the archive,

> it emerges in fragments, regions, and levels, more fully, no doubt, and with greater sharpness, the greater the time that separates us from it: at most, were it not for the rarity of the documents, the greater chronological distance would be necessary to analyze it. (p. 130)

As a photo is a limited representation of its subject, so is the archive a limited representation of the discourse. Although the photo becomes clearer over time, it never reveals its subject in its totality.

**Power/Knowledge**

According to Blair (1987), statements

> are uttered and/or transcribed sets of signs or symbols to which as status of knowledge may be ascribed, which establish or maintain unique relationships among individuals among individuals and groups, and which enact a particular view of the self. Any utterance or transcription to which a meaning may be attached is a statement. (pp. 368-369)

Like Blair (1987), both Foucault (1969/1972a) and St. Pierre (2000) discuss the statement as the knowledge produced in discourse. Each statement is formed according to the possibilities and limitations of the discourse and its rules of formation, which are established and maintained through *power relations* (cf. Foucault, 1969/1972a; 1980a). Foucault uses *power relations* or *relations of power* to distinguish his approach to power from Marx and Freire.\(^ {11} \) This phrase captures the idea that power is constituted both by those who wield power and those who resist it (Rouse, 2005).

---

\(^ {11} \) Foucault uses *power relations* and *relations of power* in his discussions of power. He does, however, occasionally use only *power*. He explains that he uses all of these words interchangeably: “I scarcely use the word *power*, and if I use it on occasion it is simply as shorthand for the expression I generally use: *relations of power*” (Foucault, 1984/1994b, p. 291).
Power relations. Discourse, as arbiter of what is thinkable, speakable, and knowable, is a form of power (Forell, 2008). Power enacts the rules of exclusion under which discourse operates and maintains the discipline required for discourse to exist.

Foucault (1976/1990a) is clear about the way that he does not conceptualize power:

But the word power is apt to lead to a number of misunderstandings—misunderstanding with respect to its nature, its form, and its unity. By power, I do not mean “Power” as a group of institutions and mechanisms that ensure the subservience of the citizens of a given state. By power, I do not mean, either, a mode of subjugation which, in contrast to violence, has the form of the rule. Finally, I do not have in mind a general system of domination exerted by one group over another, a system whose effects, through successive derivations, pervade the entire social body. The analysis, made in terms of power, must not assume that the sovereignty of the state, the form of the law, or the over-all unity of a domination are given at the outset; rather these are only the terminal forms power takes. (p. 92)

Foucault sees power as having the potential to be both productive and repressive (Danaher, Schirato, & Webb, 2002; Dreyfus & Rabinow, 1983; Foucault, 1984/1994b; St. Pierre, 2000). This notion of power is a gentler idea that differs significantly from and responds to the more common ideas of power as “inherently evil” (St. Pierre, 2000, p. 488) or “silencing and forbidding” (Meadmore, Hatcher, & M william, 2000, p. 465) as defined within Western culture. According to Foucault (1980a):

All power, whether it be from above or from below, whatever level one examines it on, is actually represented in a more-or-less uniform fashion throughout Western societies under a negative, that is to say a juridical form. It’s the characteristic of our Western societies that the language of power is law, not magic, religion, or anything else. (p. 201)

Here I represent the Western idea of power as a negative force using two different conceptions of power based on Marx and Freire.

On the one hand, Marxism conveys a class-based idea of power as a commodity or possession. In The Communist Manifesto, Marx and Engels (1888/2002) assert that
society is divided into two classes: the bourgeois and the proletariat. Power, according to Marxism, is a possession of the bourgeois, who has the ability to produce, exercised to maintain the subjugation of the proletariat, who is restricted to labor functions (Johannesson, 1998). A single source of power implies that there is complete domination by one class (Giroux, 1988) and also a single mode of resistance: the revolt of the proletariat (Marx & Engels, 1888/2002). A major critique of Marxism is that its class focus is reductive and fails to acknowledge social complexities that are based on factors such as gender and race. Power comes from multiple places and works on each person differently according to a variety of factors. One group, therefore, cannot possess exclusive rights to power. Johannesson (1998) summarizes:

The Marxist chief contradiction [the relationship between the bourgeois and proletariat] should be decentered because power does not come from one source and there are multiple loci for resistance that must be carried out in local struggles at the everyday level of social relations. (p. 307)

On the other hand, however, Freire (1970/2000) opens up the idea of power beyond class and establishes a difference between power and oppression by introducing the concept of agency for the oppressed. Freire (1970/2000) sees power as a dehumanizing position for both the oppressed and the oppressors “who oppress, exploit, and rape by virtue of their power, cannot find in this power the strength to liberate either the oppressed or themselves” (p. 44). The oppressed, according to Freire (1970/2000), have the power, through praxis, “to regain their humanity” (p. 48): “To no longer be prey to [oppression’s] force, one must emerge from it and turn upon it. This emergence can occur only by means of the praxis: reflection and action upon the world in order to transform it” (p. 51).
Foucault’s power is a direct critique of Marxism and differs from Freire’s praxis. Unlike both Marx and Freire, Foucault does not see any possibility for freedom from power because “we are born into relations of power from which we cannot escape” (St. Pierre, 2000, p. 492), nor does he see a need for such freedom because power has the potential to be both productive and repressive. He uses the teacher-student relationship as an example of productive power:

I see nothing wrong in the practice of a person who, knowing more than others in a specific game of truth, tells those others what to do, teaches them, and transmits knowledge and techniques to them. The problem in such practices where power...must inevitably come into play is knowing how to avoid the king of domination effects where a kid is subjected to the arbitrary and unnecessary authority of a teacher, or a student put under the thumb of a professor who abuses his authority. (Foucault, 1984/1994b, pp. 298–299)

Here Foucault illustrates a fine line between productive and repressive power that is governed by the ethical relationship between the teacher and the student (Foucault, 1984/1994b). Foucault addresses ethics in his late work, which is not a part of this analysis.

“Foucault asks new questions about power” (Marshall, 2004, p. 265). For Foucault, power is not an object or structure (Danaher et al., 2002; Dreyfus & Rabinow, 1983; Foucault, 1976/1990a). Instead, it is a strategy used to exercise control in both positive and negative ways (Foucault, 1984/1994b). Foucault does not deny that power can be used as a means of oppression, but he does not limit power as a sovereign and constraining force (Fox, 1998; Marshall, 2004). Power can also work in productive ways to create and maintain knowledge and discourse (Fox, 1998). Power is not a thing that can be “possessed, seized or shared” (Foucault, 1976/1990a, p. 94), but rather something—“the multiplicity of force relations immanent in the sphere in which they
operate and which constitute their own organization” (p. 92)—that circulates within relationships, hence the phrase power relations, and makes knowledge possible.

**Knowledge and power.** Foucault (1969/1972a) describes knowledge in four ways:

- That of which one can speak in a discursive practice, and which is specified by that fact.
- The space in which the subject may take up a position and speak of the objects with which he deals in his discourse.
- The field of coordination and subordination of statements in which concepts appear, and are defined, applied and transformed.
- [That which] is defined by the possibilities of use and appropriation offered by discourse. (pp. 182-183)

He finishes this description with a reminder that “there is no knowledge without a particular discursive practice” (p. 183). In other words, knowledge cannot exist outside of discourse. Knowledge, therefore, is not without bounds; as the number of possible statements within a discourse is finite, so it the knowledge produced therein. Foucault popularized the term power/knowledge to illustrate the symbiotic relationship between power and knowledge. While the power relations that maintain the discourse also dictate knowledge production, Foucault also proposes the reverse: the knowledge produced also presupposes some conditions that make it possible (St. Pierre, 2000).

Foucaultian knowledge cannot exist outside of power, which “operates through persons rather than upon them” (Usher & Edwards, 1994, p. 92). He presents a dynamic understanding of both power and knowledge (Rouse, 2005) where power and knowledge are always already in motion and working together. It is this inextricable relationship that Foucault terms pouvoir-savoir or power/knowledge.¹² Foucault does not use power/knowledge to imply that power and knowledge are synonymous. Nor is he

¹² In some texts, this term is written as power-knowledge.
asserting that knowledge is inherently infused with power. Rather, knowledge becomes powerful when it is produced within discourse when that discourse has reached a dominant position and become accepted as true (Van Cleave, 2012).

**Document as Monument**

Foucault (1969/1972a) defines mainstream history as “that which transforms documents into monuments” (p. 7). This transformation is based upon the value that history has placed on documents as primary sources. We look upon the monuments with certainty as representations of “the way it was,” whereas a document is something less permanent that can be edited or replaced. Granting monumental status to the document presents a history that is certain and continuous, ignoring the complexity of events and “how statements (texts) form and transform” (Hutcheson, 2012, p. 5). The problem with a monument is that it stands as a symbol often without critique. Like the stone carving of confederate generals that, when appropriately illuminated, can appear to trample on top of large communities of Black people living at their feet in Stone Mountain, Georgia (Morris, 2012; Morris & Monroe, 2009), we celebrate monuments without critique and we rarely “dig through” (Hutcheson, 2012, p. 5) them, look beyond them, or tear them down.

**Methodological Concepts**

In addition to his theoretical concepts, Foucault established two significant methodological concepts: archaeology and genealogy. He used each of these methodological approaches to examine the history of discourse from two different angles. Foucault’s theoretical and methodological concepts have become part of present discussions in historiography although some, like discourse and power, have gained a
stronger hold than others (Coloma, 2011; Howell & Prevenier, 2001; Hutcheson, 2012; Murphey, 2011).

**Foucault as Historian**

There is debate among historians concerning if Foucault should share their title. Bentley (1999) positions Foucault as “among historians perhaps the most influential [postmodern] thinker,” but, in the following sentence, calls Foucault, at best, a bad historian (p. 141). Franklin (2011) does not offer Foucault the title of historian, instead calling him “a poststructural social theorist” (p. 268), while Wood (2008) calls him an “unclassifiable thinker” (p. 55). Historians are challenged by Foucault’s style as his work is intended to disrupt the traditional standards by which they measure it (Wood, 2008). In addition to Bentley’s critique, Rowlinson and Carter (as cited in Coloma, 2011) offer six lines of criticism of Foucault for historians: “(1) impenetrable style; (2) avoidance of narrative; (3) ambivalence to truth; (4) errors in historical facts; (5) neglect of relevant historiography; and (6) questionable historical explanations” (p. 191). Despite this disagreement, “it is undeniable that Foucault has had an impact far greater than his predecessors; and that impact must be attributed, in part, to the fact that he offered a theoretical and methodological apparatus which historians has previously not had” (Howell & Prevenier, 2001, p. 109).

Foucault was well aware of controversial nature of his work within the historical community. In his own words:

Perhaps the reason why my work irritates people is precisely the fact that I’m not interested in constructing a new schema, or in validating one that already exists. Perhaps it’s because my objective isn’t to propose a global principle for analyzing society. And it’s here that my project has differed since the outset from that of historians. They—rightly or wrongly, that’s another question—take ‘society’ as the general horizon of their
analysis....My general theme isn’t society but the discourse of true and false, by which I mean the correlative formation of domains and objects and of the verifiable, falsifiable discourses that bear on them; and it’s not just their formation that interests me, but the effects in the real to which they are linked. (Foucault, 1981/1991, p. 85)

In this interview, Foucault distinguishes his project from that of mainline historians through *eventalization*, a process of “rediscovering the connections, encounters, supports, blockages, plays of forces, strategies and so on which at a given moment establish what subsequently counts as being self-evident, universal and necessary” (Foucault, 1981/1991, p. 76). Eventalization brings to light historical contents that have disqualified, “neglected, filtered out, [and] actively deprioritized by the organizing structures of orthodox systems of theory and knowledge” (Hook, 2005, p. 5). Through this process, “Foucault...offers us a potent combination for critique: reactivate historical contents alongside a set of dismissed, rejected knowledges” (Hook, 2005, p. 5).

Eventalization stands in contrast to the traditional historian’s focus on locating a line of causation by “effecting a sort of multiplication or pluralization of causes” (Foucault, 1981/1991, p. 76). In its simplest terms, eventalization “[focuses] on particulars [of history] as opposed to glossing over them” (Prado, 2000, p. 34).

Foucault’s approach to history came in two forms spanning the first two periods of his career as marked by Han’s (1998) periodization of his work. During the Archaeological Period, Foucault published *The Birth of the Clinic* (1963/1994c), *The Order of Things* (1970/1994d), and *The Archaeology of Knowledge* (1969/1972a). The

---

Genealogical Period followed with *The Order of Discourse*,\textsuperscript{14} *Discipline and Punish* (1975/1995), and the first volume of *The History of Sexuality* (1976/1990a). The second (1984/1990b) and third (1984/1988) volumes of *The History of Sexuality* make up the final period that Han calls “The History of Subjectivity” (p. xiii).\textsuperscript{15} Archaeology—“analysis of systems of knowledge”—and genealogy—“analysis of modalities of power” (Davidson, as cited in Prado, 2000, p. 24)—are the two historical approaches most discussed among historians.

Foucault’s studies were motivated by his own interests as he “searched for answers to current conflicts that he was involved in as cared passionately about” (Jardine, 2005, p. 14). His enthusiasm led him to work meticulously as he gathered and pored over documents for months and sometimes years (Jardine, 2005; Lechte, 1994). In *The Order of Things: An Archaeology of the Human Sciences* (Foucault, 1970/1994d) and *The Archaeology of Knowledge* (1969/1972a), Foucault pursued a archaeological history of systems of knowledge by examining systems of knowledge in the 16th and 18th centuries (*The Order of Things*) and describing the framework for such a history (*The Archaeology of Knowledge*). By presenting a comparison of the nature of knowledge in the two centuries, Foucault shows how that nature shifted across time and implies that such a shift can occur again. It is from this observation of the past that Foucault provides the reader with a framework for understanding current systems of knowledge allowing the

\textsuperscript{14} *The Order of Discourse* was published as an appendix to *The Archaeology of Knowledge* in the English translation.

\textsuperscript{15} This is not an exhaustive list of Foucault’s publications but rather a reference used to periodize several of his key works.
reader to “see what we need to target to change our own system of knowledge and power” (Jardine, 2005, p. 17).

In *Discipline and Punish: The Birth of the Prison* (Foucault, 1975/1995), Foucault turned to the prison as his object of genealogical study. In this work, the prison is an example of how institutions—including schools—construct knowledge of individuals through surveillance and discipline. Foucault used Bentham’s Panopticon\(^\text{16}\) to demonstrate how prisoners are shaped in prisons and how power, through surveillance and discipline, is simultaneously strategic and anonymous (Kendall & Wickham, 1999). He also showed how power can be both a positive and a negative force within the same institution. By using history to present a different conceptualization of power and the relationship between power and knowledge, Foucault again provides a framework through which the reader can consider other institutions. Thus, in both his archaeological and genealogical work, Foucault did not perform historical inquiry for its own sake. Rather, he used history to provide a platform for thinking about current issues differently.

Lightbody (2010) describes genealogy as a process of “[studying] values by examining the historical origin of values” (p. 1), but Foucault would disagree with the notion of a singular origin. For Foucault, history has no beginning and no end; it is,

---

\(^{16}\) Foucault (1975/1995) describes the physical nature of the Panopticon: 

[At] the periphery, an annular building; at the centre, a tower is pierced with wide windows that open onto the inner side of the ring; the peripheric building is divided into cells, each of which extends the whole width of the building; they have two windows, one on the inside, corresponding to the windows of the tower; the other, on the outside, allows the light to cross the cell from one end to the other. All that is needed, then, is to place a supervisor in a central tower an to shut up in each cell a madman, a patient, a condemned man, a worker or a schoolboy…. They are like so many cages, so many small theatres, in which each actor is alone, perfectly individualized and constantly visible. (p. 200)
rather, a perpetual presence because it has no destination and relies on a series of contingencies rather than causes (Kendall & Wickham, 1999). Contrary to the neatness of historical narrative, Foucault (1971/1984a) describes historical beginnings as “lowly: not in the sense of modest...but derisive and ironic, capable of undoing every infatuation” (p. 79).

Instead of considering the origin from which values emerge, I prefer Lightbody’s (2010) metaphor:

By tracing the “lines of decent” of a present interpretation to an earlier one, philosophical genealogists effectively demonstrate the long sign-chain of interpretations that were responsible for producing the current idea. In this way the genealogist demonstrates the “origin” or perhaps more precisely put the “soil” from which our contemporary concepts, laws, and social norms developed and even in what direction such concepts may be headed. (p. 1)

The “soil” to which Lightbody refers contains the environmental conditions necessary for contemporary values to spring forth, a nod to archaeology as the study of the conditions of possibility of discourse (Foucault, 1971/1984a).

Archaeology

Both of Foucault’s methodological approaches, archaeology and genealogy, gather around the statement. In archaeology, the central question is “How is it that one statement appeared rather than another?” (Foucault, 1969/1972a, p. 27). With this question, Foucault makes apparent his intention to locate (or attempt to locate) the “conditions of possibility” (Walshaw, 2007, p. 10) for the appearance of a statement. This question allowed Foucault, through archaeology, to look at knowledge as something that is “constructed historically in specific discourses within particular circumstances” (Walshaw, 2007, p. 10) rather than something that seems to miraculously appear.
In his discussion of knowledge, Foucault uses two French representations: *savoir* and *connaissance*. *Savoir* refers to formal knowledge in the form of “concepts, practices, procedures, institutions, and norms” (Scheurich & McKenzie, 2005, p. 846). Hutcheson (2012) notes that *savoir* denotes an element of power that commands respect. One who possesses this type of knowledge would most likely carry with her or him a title such as “mathematician,” “biologist,” or “lawyer.” *Connaissance* represents bodies of knowledge or disciplines that are more commonplace or imbued with less power (Scheurich & McKenzie, 2005). These knowledges seem to have more of a skills-based flavor such as knowledge of sewing or playing a sport. *Savoir*, then, refers to the conditions that make possible the development of *connaissance* or, conversely, “*connaissance emerges out of savoir*” (Scheurich & McKenzie, 2005, p. 848).

Foucault (1968/1994a) uses the concepts of *savoir* and *connaissance* as the basis for the following definition of archaeology:

By archaeology I would like to designate not exactly a discipline, but a domain of research, which would be the following: in a society, different bodies of learning, philosophical ideas, everyday opinions, but also institutions, commercial practices and police activities, mores—all refer to a certain implicit knowledge [savoir] special to this society. This knowledge is profoundly different from the bodies of learning [des connaissances] that one can find in scientific books, philosophical theories, and religious justifications, but it is what makes possible at a given moment the appearance of a theory, an opinion, a practice. (p. 261)

Scheurich and McKenzie (2005) use the discipline of psychiatry as an example:

Whereas the history of psychiatry is typically written solely in terms of psychiatry as a formal discipline...Foucault is arguing that this is inadequate. To better understand the history of psychiatry as a formal academic discipline, it is also necessary to study a much broader array that includes relations among “hospitalization, internment, the conditions and procedures of social exclusion, the rules of jurisprudence, the norms of industrial labor and bourgeois morality” as well as legal texts, literature,
philosophy, political decisions, and the statement and opinions of daily life. (pp. 846-847)

In summary, Foucault’s archaeology is the study of *savoir* as the “conditions of possibility” (Walshaw, 2007, p. 10) of *connaissance*.

Foucault’s archaeology is based on his critique that traditional discussions of the history of *connaissance*, which Scheurich and McKenzie (2005) call “master narratives” (p. 848), were insufficient and misleading because they did not address the broader context, or *savoir*, that made *connaissance* possible. The challenge with approaching history this way is that *savoir* is neither logical nor rational and “that this process of emergence does not have a guiding or agentic subject at its center” (Scheurich & McKenzie, 2005, p. 848). In other words, *savoir* is messy. Archaeology was Foucault’s first attempt inject this messiness into traditional historical accounts that he perceived as “too deeply saturated with notions of continuity, causality, and teleology” (Heyning, 2001, p. 291). The objective of archaeology is “to unearth, to excavate factors and events, overlooked likenesses, discontinuities and disruptions, anomalies and suppressed items, which yield a new picture of whatever has previously gone unquestioned and has been taken as definitive knowledge and truth” (Prado, 2000, p. 25).

Kendall and Wickham (1999) summarize archaeology as “the process of investigating the archives of discourse” (p. 25). As a methodology, archaeology allows the historian “to avoid consideration of the ‘internal’ conditions governing speech act understanding, and to focus purely on what was actually said or written and how it fits into the discursive formation” (Dreyfus & Rabinow, 1983, p. 49). This focus allows the historian to investigate how statements become true within discourse and what discursive “rules of formation” (Foucault, 1972c, p. 227) that make that truth possible (May, 1993).
Archaeology, therefore, assumes more of an epistemological stance as a means to determine within discourse what can be known and how that knowledge comes to be privilege (Prado, 2000). It looks beneath the surface to the rules that establish and maintain the discursive formations that create and sustain knowledge (Walls, 2009).

Flynn (2005) relates archaeology to traditional history by describing it as a counter-history “because it assumes a contrapuntal relationship to traditional history, whose conclusions it more rearranges than denies and whose resources it mines for its own purposes” (p. 33). Rather than creating monuments from documents, the Foucaultian archaeologist begins by treating the texts that she or he approaches as monuments ripe for excavation in the attitude of the disciplinary archaeologist. The archaeologist’s locus of concern is not the text’s meaning, but rather “the overall configuration of the site from which it was excavated” (Gutting, 2005a, p. 34). The archaeologist studies the archive of discourse and “how ‘things said’ come into being, how they are interpreted, transformed and articulated” (Cotton, 2004, p. 220).

**Genealogy**

Foucault’s genealogy, a form of writing history (Saar, 2002), is based on Nietzsche’s genealogical work (Kafka, 2008; Labaree, 1992). In his version, Foucault (1980b) defines genealogy as “the combined product of an erudite knowledge and a popular knowledge” characterized by a “painstaking rediscovery of struggles together with the rude memory of their conflicts” (p. 83). He continues:

> A genealogy should be seen as a kind of attempt to emancipate historical knowledges from subjection....It is based on a reactivation of local knowledges—of minor knowledges, as Deleuze might call them—in opposition to the scientific hierarchisation of knowledges and the effects intrinsic to their power: this, then, is the project of these disordered and fragmentary genealogies. (Foucault, 1980b, p. 85)
It is at this point of struggle where we encounter a history that appears more as “a field of entangled and confused...documents that have been scratched over and recopied many times” (Foucault, 1971/1984a, p. 76) rather than a narrative that “emerged dazzling from the hands of a creator or in the shadowless light of a first morning” (Foucault, 1971/1984a, p. 79). Genealogy rejects history as such a metanarrative and favors historical accounts that are replete with incongruity, thus disrupting (Mahon, 1993) the romantic nature of historical narrative that is characterized by a clear beginning, middle, and end in favor of a more true (Jonas & Nakazawa, 2008) narrative characterized by “disreputable origins and unpalatable functions” (Rose as cited in Kendall & Wickham, 1999, p. 29). According to Hook (2005), the goal of genealogy is “to locate a precontext, to plot a particular historical ‘surface of emergence,’ to sketch a complex of events and circumstances” (p. 14) as opposed to the linear path of causation that connects the present to some “singular or determinant” (p. 14) origin that is the product of mainstream histories.

Genealogy maintains some elements of archaeology, including the denial of origins, but Foucault adds to it “a new concern with the analysis of power, a concern which manifests itself in the ‘history of the present’” (Kendall & Wickham, 1999, p. 29). With both archaeology and genealogy, Foucault’s intent is to disrupt historians’ “traditional understanding of change and their traditional standards of verification and evidence” (Wood, 2008, p. 54). Kendall and Wickham (1999) metaphorically describe genealogy and its potential frustrations:

[Genealogy] is, in other words, a methodological device with the same effect as a precocious child at a dinner party; genealogy makes the older guests at the table of intellectual analysis feel decidedly uncomfortable by
pointing out things about their origins and functions that they would rather remain hidden. (p. 29)

In response to this metaphor, I, along with many historians, would question what purpose genealogy serves beyond causing discomfort. For Foucault, utility is not an issue as the disruption is sufficient, but education historians are looking for more. Once the past has been eventalized and each detail stands with equal importance, what does the historian do with them? What good (Hostetler, 2005) does the disruption serve?

In his essay “Nietzsche, Genealogy, History,” Foucault (1971/1984a) states that genealogy is dependent upon “a vast accumulation of source material” (pp. 76–77) that come together not to form a compact historical narrative, but rather an effective history. There is often confusion between the terms genealogy and effective history. Genealogy refers to the intent of history or what is being investigated through the past. Genealogy as history of the present takes a present idea (e.g., Standards-based mathematics education) and maps (cf. Deleuze & Guattari, 1980/1987) the development of that idea. Effective history, a term addressing the theoretical positioning of genealogy, refers to how the history is assembled or the tone of the history. It “allows focus on seemingly small insignificant events and the way power and resistance operate to change the way subjects constitute themselves or are constituted through these acts” (Johnson Jones, 2004, p. 2). Genealogy, then, is an effective history. It maps the development of present ideas with attention to those details that may have been ignored in a more traditional historical approach. Foucault (1971/1984a) continues:

History becomes “effective” to the degree that it introduces discontinuity into our very being—as it divides our emotions, dramatizes our instincts, multiplies our body and sets it against itself. “Effective” history deprives the self of the reassuring stability of life and nature, and it will not permit itself to be transported by a voiceless obstinancy toward a millennial
ending. It will uproot its traditional foundations and relentlessly disrupt its pretended continuity. This is because knowledge is not made for understanding; it is made for cutting. (p. 88)

History is effective when it disrupts the narratives on which we have come to depend, causing us to question what we know, what we do, and who we are. The disruption of the past, therefore, has immediate consequence on the present. The impression that this disruption leaves upon the present is a concern for traditional historians who may describe it as presentism, a stance that should be carefully avoided.

**The intersections of genealogy and presentism.** Historians are concerned about “bringing discussion of the past too close to the present” (Hutcheson & Kidder, 2011, p. 221). The challenge inherent to this concern is that of defining what is ‘past’ considering that, as each moment passes, the moment before is a part of the past. Despite the tangible challenge of defining the past, the most dangerous element of presentism is altering the past in order to serve present interests. Through these well-intentioned alterations, “historians want the past to be immediately relevant and useful; they want to use history to empower people in the present, to help them develop self-identity, or to enable them to break free of that past” (Wood, 2008, p. 8).

There is a strong connection between presentism and genealogy based upon the role of subjectivity in both contexts. Foucault allows for subjectivity in the genealogical account. He criticizes historians who “take unusual pains to erase the elements in their work which reveal their grounding in a particular time and place, their preferences in a controversy—the unavoidable objects of their passion” (Foucault, 1971/1984a, p. 90). As history of the present, the purpose of genealogy is to map the history of a present idea
through the multiple truths that construct it. Great care must be taken, however, not to use this map to form another Master Narrative.

Presentism reveals the dangerous potential of such subjectivity. Potter (as cited in Novick, 1988) discusses the tension between ideology and historical realism in response to C. Vann Woodward’s *The Strange Career of Jim Crow*:

When an historian has a strong ideological commitment, a tension may be set up between his devotion to the commitment and his devotion to realism for its own sake….his historical realism was pitted against his liberal urge to find constructive meanings in the past for the affairs of the present. His realism never lost hold, but his liberal urge constantly impelled him to emphasize viewpoints which his realism constantly impelled him to qualify and dilute….The urgency of his desire to find answers in the past which would aid in the quest for solution of the problems of the present…distorted his image of the past, at least for a time and to a limited degree. (p. 354)

Foucault, or another postmodern historian, would question the idea of realism in the historical account. I take Potter’s reference to realism to mean a more true account that is not manipulated to serve any particular present ideology. Potter’s comments clearly illustrate the tension that Woodward must have felt in constructing the narrative. Novick uses Richard Hofstadter to add another layer to the issue:

Historians…are caught between their desire to count in the world and their desire to understand it. On one side their passion for understanding points back to the old interest in detachment, in neutrality, in critical history and the scientific ideal. But the terribly [*sic*] urgency of our political problems points in about direction, plays upon their pragmatic impulse….The urgency of our national problems seems to demand, more than ever that the historian have something to say that will help us. (Novick, 1988)

As a scholar in the present, the historian has a responsibility to both the present and the past (Leuchtenburg, 1992). Gilderhus (2010) argues that history has an element of utility: “history has a useful application because it helps us better to calculate the anticipated consequences of our own acts” (p. 7).
Connecting Archaeology and Genealogy

There is no consensus among Foucaultian scholars regarding the relationship between archaeology and genealogy (Scheurich & McKenzie, 2005). Some would claim the archaeological project failed causing Foucault to pursue genealogy as a superior alternative. Dreyfus and Rabinow (1983) are perhaps the most influential voices for this perspective, titling one chapter of their book *Michel Foucault: Beyond Structuralism and Hermeneutics* “The Methodological Failure of Archaeology.”

Foucault (1980b) himself implied that archaeology and genealogy are different, yet both useful:

> If we were to characterize it in two terms, then “archaeology” would be the appropriate methodology of this analysis of local discursivities, and “genealogy” would be the tactics whereby, on the basis of the descriptions of these local discursivities, the subjected knowledges which were thus released would be brought into play. (p. 85)

Therefore, the determination of archaeology’s success may be best taken from Foucault himself. Near the end of his life, he similarly summarized his work as three axes:

> To speak of “sexuality” as a historically singular experience also presupposed the availability of tools capable of analyzing the peculiar characteristics and interrelations of the three axes that constitute it: (a) the formation of sciences (saviors) that refer to it, (2) the systems of power that regulate its practice, (3) the forms within which individuals are able, are obliged, to recognize themselves as subjects of this sexuality. (Foucault, 1984/1990b, p. 4)

The first two axes refer to his archaeological and genealogical work, respectively (Scheurich & McKenzie, 2005). He later refers to these axes as theoretical shifts:

> A theoretical shift [archaeology] had seemed necessary in order to analyze what was often designated as the advancement of learning; it led me to examine the forms of discursive practices that articulated the human sciences. A theoretical shift [genealogy] had also been required in order to analyze what is often described as the manifestations of “power”; it led me to examine, rather, the manifold relations, the open strategies, and the
rational techniques that articulate the exercise of powers. It appeared that I now had to undertake a third shift [subjectivity], in order to analyze what is termed “the subject.” It seemed appropriate to look for the forms and modalities of the relation to self by which the individual constitutes and recognizes himself *qua* subject. (Foucault, 1984/1990b, p. 6)

Foucault concludes his statement about the three phases of his work by addressing them as three dimensions:

The archaeological dimension of the analysis made it possible to examine the forms themselves; its genealogical dimension enabled me to analyze their formation out of the practices and modifications undergone by the latter. There was the problematization of madness and illness arising out of social and medical practices, and defining a certain pattern of “normalization”; a problematization of life, language, and labor in discursive practices that conformed to certain “epistemic” rules; and a problematization of crime and criminal behavior emerging from certain punitive practices conforming to a “disciplinary” model. And now I would like to show how, in classical antiquity, sexual activity and sexual pleasures were problematized through practices of the self, bringing into play the criteria of an “aesthetics of existence.” (Foucault, 1984/1990b, pp. 11–12)

In each of these passages, it is apparent that Foucault saw his work as three stages of inquiry rather than as three distinct modes in which one’s failure signals the need for another. He did not, therefore, abandon one for another; instead, as he gained new understanding, he built upon his previous work.

I see archaeology and genealogy as complementary methodologies (Walls, 2009). One does not exclude the other; “rather, like successive waves breaking on the sand, each is discovered after the fact to have been an implicit interest of the earlier one, for which it served as the moving force” (Flynn, 2005, p. 29). The combination of archaeology and genealogy in this study is aimed at disrupting “unitary discourses” (Foucault, 1980b, p. 90) that exist and function by excluding and subjugating knowledges that do not align with what is acceptable within these discourses. By combining archaeology and
genealogy, I am able to address the discourse of Standards-based mathematics education in multiple ways. Archaeology allows me to address not only the question of how Standards-based mathematics education became a discourse (through archaeology), but also of how that discourse became the dominant discourse (through genealogy).

**Summary and Conclusion**

Foucault offers several theoretical and methodological concepts that address discourse and power in ways that do not align with the way those words are most often used in Western culture or in educational contexts. Discourse is an accumulation of permissible statements governed by rule of exclusion. The key question of discourse—"How is it that one statement appeared rather than another?" (Foucault, 1969/1972a, p. 27)—questions the power relations that maintain those rules of exclusion. It is these power relations that make knowledge possible or impossible within discourse, therefore power and knowledge are inextricably linked. Foucault illustrates this link using the term *power/knowledge*.

This study is not a traditional history. The object of study is not a period, a person, a group, or an idea; it is a discourse. Archaeology and genealogy, as complementary methodologies, allow the researcher to examine the picture of discourse from both background and foreground perspectives. Archaeology—the background—examines the conditions of possibility for the formation of discourse. Genealogy—the foreground—investigates how the discourse came to prominence. The goal for this type of history is not simply to provide a historical narrative, but more so to problematize the discourse that the narrative describes. The most pressing challenge of working with archaeology and genealogy, however, is that Foucault did not provide explicit instruction.
on how to “do” them (Gutting, 2005a; Johannesson, 1998; Walshaw, 2007). Without such instruction, I created a methodological assemblage using different methodological tools as I deemed them appropriate. In the following chapter, I present this assemblage and discuss the ethical tensions present within the study.
CHAPTER 3
METHODOLOGICAL ASSEMBLAGE

Halfway through data collection, I seemed to hit a wall. As is common in qualitative inquiry, I had incredible interview data that I had not anticipated and more documents than I knew how to manage (Huberman & Miles, 1994). Now what? Feeling paralyzed, I turned to Foucault on the advice of a trusted colleague. After re-reading several of his texts I realized that Foucault, the one who had lured me into this project, offered me few clues about what I should do with the mountain of data I had amassed. Reading other scholars’ work about Foucault confirmed my suspicion: the greatest methodological challenge in pursuing archaeological and genealogical work is that there is no clear methodological roadmap to follow in Foucault’s writings (Gutting, 2005a; Johannesson, 1998; Walshaw, 2007). This lack of methodological explication contributes to the tensions between traditional historiography and Foucault’s historical approaches. Foucault leaves no trace of a single methodological approach. Instead, he provides us with a range of models for examining practices and processes. Put succinctly, his methodological approach varies from one concern to another and the specific approach is chosen because it happens to respond to the demands of the particular subject matter under interrogation. (Walshaw, 2007, p. 7)

Although Prado (2000) acknowledges that “a special strategy is necessary in approaching Foucault’s work” (p. 3), neither he nor the authors that I have read offers a clear strategy for executing an archaeology or genealogy. Kendall and Wickham (1999) come closest, but, in the light of the infinite possibilities that Foucault espouses, their offering appears to be an oversimplification written for ease of digestion; their exercises are a useful beginning, but seem limiting. The variability of Foucault’s methodologies that Walshaw
describes, combined with the lack of explication from his analysts, leaves the researcher at a loss when attempting to design a study based upon Foucault’s methodologies. As a result, I found myself in a mode of methodological assemblage: beginning with the data that I gathered and making methodological moves that brought me closer to a history of the *Standards* movement.

Although Foucault does not offer many clues to his methodology, this omission is not an indicator of sloppy scholarship. Foucault does hold standards for evidence and rigor. In his methodological essay “Nietzsche, Genealogy, History,” Foucault (1971/1984a) states that genealogy is dependent upon “a vast accumulation of source material” (pp. 76–77) that come together to form an effective history. Through his historical methodologies, he advocates for “the scholarly treatment…of that which has long since been ejected from the field of the scholarly” (Hook, 2005, p. 6), but, in a point of contradiction, the data qualified for such scholarly treatment is not unlimited. Hook continues:

> The empirical materials…must qualify as documents of sorts…. The value, furthermore, of such documents or records is also largely contingent on how they are tactically put to use, linked to a greater strategic offensive. They constitute an important empirical resource, but one that needs to be linked to the operations of critical history, to a cogent ‘epistemology of critique’, if they are to be effectively utilized. (p. 7)

The materials of inquiry (i.e., data), therefore, are only eligible for scholarly treatment if they can be worked strategically into the historical argument. I selected the data for collection in this study according to such strategy.

**Data**

The data for this study included the *Standards* documents (NCTM, 1989; 1991; 1995; 2000), other curriculum and policy documents (NCTM, 1980; The National
Commission of Excellence on Education, 1983), popular press articles (Daniels, 1989; Ordoñesky, 1992), other histories of mathematics education (McLeod, 2003; McLeod et al., 1996; Schoenfeld, 2004; Walmsley, 2007), and responsive scholarly publications (Graham & Fennell, 2009; Roitman, 1998), and oral history interviews. Here I describe the data and the data collection processes.

The Standards Documents

This study began with the NCTM Standards documents (NCTM, 1989; 1991; 1995; 2000). Many who mention the NCTM Standards refer only to the CESSM and PSSM because, as “curriculum” documents, they were considered the major foci of the Standards movement. I chose, however, to include the PSTM and ASSM as I believe that these documents have contributed to the shape of school mathematics and I assign the same importance to curriculum, teaching, and assessment within the “network of mathematics education practices” (Valero, 2012, p. 374).

---

17 My initial research plan included visiting NCTM headquarters in Reston, Virginia to look through their archives. When I contacted Karen King, NCTM Director of Research, to inquire about the availability of archives for research, she replied that there are no archives available “beyond what is absolutely required by law.” She continued: You would have a better chance of finding the information via the people involved….We don’t have any records of that sort here at headquarters. We do have Board meeting minutes, but they are minutes in the technical sense (you can see the types of things usually included at http://www.nctm.org/news/content.aspx?id=31333), not notes. There is no archive of notes with more detail than a discussion was had or an action was taken or an appointment was made. (personal communication, February 8, 2012)


19 I discuss this position further in the following chapter.
It would seem that the *Standards* documents would be the center of this study, and that may be true in this moment. The documents were, indeed, a launching point for the study. However, as I dug inside, underneath, and around the documents and also looked at them from a larger socio-political perspective, I noticed that my inquiry had become decentered. The picture became larger than the NCTM *Standards*. During data analysis I chose to embrace this decentering and approach these documents by simultaneously zooming in and out on them (Stinson & Bullock, 2012).

In my eyes, the *Standards* became more like something that happened along the way rather than a series of key events. It was curious, however, that although the *Standards* represent one set of conversations among many, mathematics educators considered them to be the backbone of U.S. mathematics education in the 1990s, the 2000s, and, in many ways, today. It is from this point of curiosity that my genealogical and archaeological analysis took shape. The *Standards* documents themselves, then, became a part of the picture, rather than the picture. As a result, you will notice that I cited the *Standards* documents much less than expected and did not spend much time discussing their contents. Instead, I spent more time discussing their surroundings.

**Other Official Documents**

In order to establish the *Standards* movement as a discourse, I had to consider other documents that both supported the creation of (NCTM, 1980; 1981) and

---

20 I see this dissertation as one moment within my continuous study of standards in mathematics education, mathematics curriculum, mathematics education policy, and mathematics education history writ large. Through the freedom that my postmodern theoretical leanings grant me to not “write a single text in which everything is said to everyone” (Richardson, 1994, p. 518), I am pressing Pause rather than Stop in this moment because this analysis remains incomplete; it has generated many more questions and lines of flight (Deleuze & Guattari, 1980/1987) that I will follow after this work. I will discuss some of these additional questions in the concluding chapter.
demonstrate the effects of (Herrera, Kanold, Koss, Ryan, & Speer, 2007; Kulm, 1994; National Research Council, 2001) the *Standards* documents. Jager and Maier (2009) discuss the importance of extending the analysis of discourse beyond a single document—or, for the purposes of this project, set of documents—:

A single text has minimal effects, which are hardly noticeable and almost impossible to prove. In contrast, a discourse, with its recurring contents, symbols, and strategies, leads to the emergence and solidification of ‘knowledge’ and therefore has sustained effects. What is important is not the single text, the single film, the single photograph and so on, but the constant repetition of statements. (p. 38)

Several of these documents were no longer available in print but I was able to secure them electronically via the Center for the Study of Mathematics Curriculum, a National Science Foundation (NSF)-funded joint venture among Michigan State University, the University of Missouri, Western Michigan University, and the University of Chicago.21

**Responsive Publications**

In the interest of data reduction (Huberman & Miles, 1994), I use the term “responsive publications” to refer to literature that was written about or in response to the *Standards* documents. In order to locate this literature, I began by performing literature searches using the names of each of the *Standards* documents in databases such as Google Scholar, ERIC, and JSTOR. I also used the “Cited by” feature in Google Scholar to locate publications that cited these documents. The collection of responsive publications included in this study, albeit thorough, is not exhaustive. I do not claim to have included all possible responsive publications because it is not possible to locate all of the literature related to any topic. Most of the literature that I uncovered did not

---

21 [http://www.mathcurriculumcenter.org](http://www.mathcurriculumcenter.org)
qualify as a responsive publication as defined here because the *Standards* documents were not the focus of the work. Most of the empirical studies, for example, were excluded from the set of literature used as data because those studies used the *Standards* documents as background literature.

In the literature search, I prioritized articles published in NCTM journals including the *Journal for Research in Mathematics Education*, *NCTM News Bulletin*, *The Arithmetic Teacher*, *Teaching Children Mathematics*, *Mathematics Teaching in the Middle School*, and *The Mathematics Teacher*; mathematics journals such as *Notices of the American Mathematical Society*; and other mathematics education journals such as *Educational Studies in Mathematics*, *For the Learning of Mathematics*, the *Journal of Mathematics Teacher Education*, and *School Science and Mathematics*. My search also included more generalist educational research journals such as *Teachers College Record*. In addition to these peer-reviewed publications, I used some online articles and postings from websites such as *Mathematically Correct*22 and *Mathematically Sane*.23

**Previous Historical Work**

In addition to responsive publications, I included previous historical work in mathematics education as data in this study. Walmsley’s (2007) *A History of Mathematics Education During the Twentieth Century*, though not a detailed analysis, provides a strong outline of key events in mathematics education. NCTM published two historical works, both edited volumes, that helped to provide a historical skeleton for this study: the 32nd yearbook entitled *A History of Mathematics Education in the United

---

22 [http://www.mathematicallycorrect.com](http://www.mathematicallycorrect.com)

23 [http://www.mathematicallysane.com](http://www.mathematicallysane.com)
States and Canada (NCTM, 1970), commissioned for the NCTM semi centennial (NCTM, 1970), and the two-volume A History of School Mathematics (Stanic & Kilpatrick, 2003b). The former focuses on mathematics education prior to the Standards movement. Although much of the 2003 volumes’ content does overlap chronologically with the 1970 yearbook, the NCTM Executive Board commissioned them to be a “companion to [the] 1970 yearbook” (Stanic & Kilpatrick, 2003a p. xi) and they do include content about the Standards movement. McLeod and colleagues’ (1996) Bold Ventures study, although labeled as a case study and not a history (Raizen, 1997), was another key piece of data that provided different insight into the process of creating the Standards.

Oral History Interviews

In deciding how I would conduct this study, my first thought was to focus on analyzing the Standards documents; oral history was a secondary data source that I hoped would work. I was unsure of how responsive the potential participants would be and believed that the interviews would be, at best, a sprinkling amongst a largely pool of documentary data. I was overjoyed when 25 writers agreed to be interviewed, making the oral history interviews more central to this study than I had anticipated.

Oral history. Although oral history interviewing is “a close cousin” (Abrams, 2010, p. 2) to qualitative interviewing, there is a clear historical intent in oral history that highlights the “interplay between the past and present, the individual and the social” (Shopes, 2011, p. 451). Many scholars, and particularly feminist scholars (Borland, 1991), often champion oral history as a method that provides “a way to reach groups and individuals who have been ignored, oppressed, and/or forgotten” (Fontana & Frey, 1994,
p. 368). As a historiographical method, oral history has provided a medium by which the people of history who are often absent from the historical narrative become “producers and interpreters of their own history” (Shopes, 2011, p. 455). It seems paradoxical to use this argument for my use of oral history in this study, particularly when I also approach my informants\textsuperscript{24} ethically as elites later in this section. Although each participant has gained a position of great repute within the mathematics education community, each of their voices has been hidden within the NCTM Standards documents behind the organization’s name. The documents represent a consensus between the writers and the NCTM leadership where, although the participants in this study would not be considered marginalized by most standards,\textsuperscript{25} they become marginalized in a broader sense because they are lost in the narrative of the NCTM Standards. Oral history provides a way to tease apart the voices hidden within consensus (Perks & Thomson, 1998) so that a new narrative becomes possible.

**Anonymity.** During my presentation of the prospectus for this study, the committee and I engaged in a lengthy discussion regarding anonymity. In the proposal, I presented a completely non-anonymous oral history study. In the discussion, we entertained alternatives including offering the option of anonymity and using a completely anonymous approach with pseudonyms. I decided to ask the participants to forego anonymity and maintain their identities within the study. I offered them the opportunity to review and edit the transcripts at their discretion, which did not present a

\textsuperscript{24} I use the terms informant, participant, narrator, and interviewee interchangeably to refer to those who consented to participate in this study.

\textsuperscript{25} I refer to the more common perception of marginalization as the exclusion of people based upon race, ethnicity, class, gender, sexual orientation, or ableness (Bullock, 2012).
challenge with the Institutional Review Board (IRB). All of the narrators provided their consent without questioning the issue of anonymity. It is possible that some of those contacted were uncomfortable with relinquishing anonymity, but no one directed any objection toward me.

**Selection.** To select participants for the oral history interviews, I began by listing the personnel associated with writing the *Standards* as found in the acknowledgement sections *CESSM, PSTM, ASSM*, and *PSSM*. For my own reference, I classified each person listed according to her or his apparent position or affiliation at the time (e.g., classroom teacher, university professor, NCTM staff) as listed in the document. I also indicated each document in which the participant was involved and the nature of that involvement (e.g., editor, working group member, grade level chair). In the resulting chart, I was able to see each of the 128 potential participants and how she or he was involved across the span of these documents.

Next, I used Google to locate contact information for each narrator. I searched for each name as recorded in the original documents. If I was unsure of the accuracy of the results, I entered “mathematics” as an additional search term, which often narrowed the results sufficiently. I found that several of the participants are now deceased. I was able to locate information about some of the narrators leading up to a point that could be a point of retirement. In the end, I was able to locate contact information (either an email address, mailing address, or both) for 75 participants. I was able to confirm that seven

---

26 Some of the participants were not classified, as *ASTM* did not include affiliation in the author list.
people on the list were deceased. I discarded five people because they were based in Canada.\textsuperscript{27} I was unable to locate reliable contact information for 41 people on the list.

**Contacting the narrators.** My solicitation strategy began with a well-crafted letter sent on Georgia State University College of Education Department of Middle-Secondary Education and Instructional Technology letterhead that included a summary of my research and the process that I planned for the interviews. I also included an estimate of the time commitment required: a total of approximately six hours over six months (see Appendix B).\textsuperscript{28} I also included my curriculum vitae and contact information for my major professor (Goldstein, 2002). In the letter, I was clear that those who agreed to participate would forego confidentiality and outlined my plan for negotiating the final transcript.\textsuperscript{29} I sent these letters both by email and U.S. mail in a package that also included my curriculum vitae, a consent form approved by the IRB, and a list of tentative interview questions (see Appendix C). All of the narrators contacted me via email in response to the invitation. After sending letters requesting participation to the 75 potential participants via email and U.S. mail, I was able to secure interviews with 24 participants. One participant, Lynn Steen, was unavailable for an interview, but did consent to responding to my interview questions in writing.

\textsuperscript{27} Later, I wondered whether this dismissal was appropriate. Although the Canadian writers could not speak to changes within the U.S. context, they could speak to the activity of the writing group. I decided to leave these five participants out of the sample because I had a large number agree to participate.

\textsuperscript{28} I generously estimated approximately one hour for the interview and an additional five hours to review the edited transcript.

\textsuperscript{29} The process that I term “negotiating” would more commonly be known as “member checking.” I address my reasoning for changing terms in my later discussion of ethics in interviewing.
Preparing for interviews. In preparation for each interview, I again turned to Google and Google Scholar to locate any publicly available background information for each narrator. I was able to locate more information for some than for others. My preparation also included reading publications written by several of the narrators and noting questions generated from my reading (Shopes, 2011; Sommer & Quinlan, 2009).

I contacted each narrator via email two days before the interview to remind them of the date and time, verify the telephone number or Skype address for contact, and offer the opportunity to reschedule the interview if needed. Approximately 30 minutes prior to the interview, I tested the digital recorders and changed batteries when needed. When I called the participant, I introduced myself, thanked her or him for participating, and answered any preliminary questions. I also asked for any time constraints so that I could be sure to watch the time out of respect for any other obligations. In the initial contact letter, I estimated the interview time to be approximately one hour and most of the interviews concluded in that time. If I felt that the interview would last longer, I would ask the narrator after about 45 minutes if she or he wanted to conclude the interview out of respect for her or his time.

Conducting interviews. Although I prepared and distributed an interview protocol, the oral history interviews were loosely structured to encourage the narrators to reflect upon their experiences. My intent as interviewer was to conduct interviews that had “a measured, thinking-out-loud quality” (Shopes, 2011, p. 452). I began each

---

30 I conducted the interviews via telephone or Skype. I would have preferred to interview in person, but limited funds prohibited me from doing so. In the end, “a telephone interview [is] better than no interview at all” (Sommer & Quinlan, 2009, p. 62).

31 I used two digital recorders to capture the interviews to ensure that I would have at least one quality recording.
interview asking the narrator to discuss her or his career history and the story of her or his involvement with NCTM. From that point each interview took a different turn, rarely following the pre-determined interview protocol. My goal was to maintain a conversational character while “encouraging the narrator to remember details, seeking to clarify what is muddled, making connections among seemingly disparate recollections, challenging contradictions, [and] evoking assessments” (Shopes, 2011, p. 452).

Transcription. For the first level of data analysis (Bird, 2005), I chose to transcribe each interview myself using the transcription software Transcriva. I created two transcripts of each interview: a verbatim version and an edited version, listening to each tape at least four times: once to complete the verbatim transcript, once to verify the verbatim transcript, once to assist in editing the transcript, and at least once more after transcription to make memos during analysis.

Declination and no response. Despite the overwhelming response to my interview requests, there were still several members of the writing groups who did not participate because I was not able to contact them, they politely refused to participate, or they did not respond to the request. Although I was disappointed in these instances, interviewing people who have a public presence offers an advantage over most qualitative interviewing scenarios (Goldstein, 2002): for many of the potential participants who declined, did not respond, or whom I was unable to contact, I was able to include them, albeit in a diminished capacity, through their writings related to the NCTM Standards. For example, Marilyn Hala, an NCTM staff member who participated

---

32 In the verbatim transcripts I included all words and sounds from the interviews including pauses, repeated words and syllables, and filler sounds such as “um” and “uh.” I also attempted to catch all laughter, sighs, long pauses, and other speech events.
on the *PSTM* writing team, is no longer on the NCTM staff and I was unable to locate current contact information for her. Although I did not interview her, she did participate in McLeod and colleagues’ (1996) *Bold Ventures* study, which allowed me to gain some insight into her thoughts through that study’s filter.

**Ethics and power relations in interviewing.** Initially I planned to write briefly about the ethical issues that I encountered in the oral history interviews. One day during transcription, I heard a participant’s statement that immediately caused me to think, “I will never be able to use that. That statement could be harmful.” This narrator\(^{33}\) has invested much time and effort into building her or his reputation and I noticed that one statement, taking and isolation and without anonymity, could mar that reputation. After some thinking and reading and writing I realized my concern for guarding these narrators from the exposure of such statements was the result of a particular set of power relations in operations between the narrators and me.

I am a doctoral candidate in mathematics education and former high school teacher. Since 2005, I have been reading the works of mathematics education scholars and governing myself as a teacher and, to a lesser extent, as a researcher by their writings. At the time of these interviews, I was also actively applying for a tenure track assistant professor position in mathematics education. On the other end of the telephone was someone who I admired who was also a member of the “club” of scholars to which I aspired. And I was not their only admirer. Each narrator had gained respect in her or his sphere of influence. Additionally, they each knew the ins-and-outs of research. I was intimidated and worked to disguise my anxiety and maintain scholarly composure.

---

\(^{33}\)These statements do not refer to a single participant. There were several statements that gave me pause across several interviews.
True to Foucault’s multi-directional concept of power relations, I was not at the bottom of these power relationships. As a researcher, I held the power of representation. I also had the power to choose to be ethical and to build trust. In most interview-based studies, these power relations are asymmetrical in favor of the interviewer with the interviewee having little or no power in the relationship (Mero-Jaffe, 2011). When the participants maintain a public professional image, the balance of power shifts. These situations are addressed in a small, yet powerful, body of qualitative research literature as “elite interviews” (Berry, 2002; Goldstein, 2002; Kezar, 2003; Mikecz, 2012; Neal & McLaughlin, 2009).

I have to admit my own reluctance to label these oral history interviews as “elite interviews.” My resistance is not based upon a lack of regard for the participants and their positions within the mathematics and mathematics education communities. Rather, it is the high regard that I hold for all research participants, regardless of context, that gives me pause. I have engaged in interviews in several research projects and have encountered different ethical concerns with each. I hesitate to infer that I have been more sensitive to ethical concerns with these participants than I would with others. Although ethical concerns related to elite interviewing are no more grave that those of any other interviewing scenario, they are unique. The particular relations of power evident in this set of interviews caused me to make several decisions during the study that I may not have made under different circumstances. I outline three of those most significant decisions here: eliminating follow-up interviews, editing transcripts, and negotiating the final record of the interview.
Oral history interviews most often follow an iterative design (Grbich, 2007), collecting several interviews until there appears to be no new data revealed. I did not include follow-up interviews in the initial solicitation because I thought that asking for an hour-long interview was a sufficient imposition. My slight intimidation with making requests of people whom I have admired based on their reputations and scholarship caused me to ask for as little as possible, despite the fact that some of the narrators offered to contribute more as needed. Although I did not conduct follow-up interviews, I did use the process of returning the transcript to the narrators as an opportunity to ask additional questions using the Microsoft Word comment feature.

Another decision that I made based on the status of the interviewees was the edited transcript. When I completed the first verbatim transcript, I was delighted by the interview content and did not want the narrator to strike any of the content. I decided to create an edited version of the transcript that included punctuation and omitted repeated words and other less-than-desirable speech events. This decision was not easy, particularly because I thought that the idiosyncrasies of each narrator’s speech lent a sort of genuine character to the transcripts. After all,

Oral history is “You know, you know.” It is “And this and that and that.” It is “Well, let me see, I think…no, that must have been…I can’t…just a minute,” and so forth. Oral history is what comes out of people’s mouths. (Allen, 1982, p. 35)

On the one hand, I was very concerned with the integrity of the spoken word; but on the other hand, I thought of how silly I might feel if all of the false starts of my own speech appeared in print. Allen (1982) warns that narrators may be “appalled by the ungraceful stops and starts and may edit you out of business when they receive a copy for their
approval” (p. 37). Because of this potential embarrassment, Allen endorses removing these speech challenges:

The only alterations ventured by a transcriber or an editor in creating a transcript should be those which enhance the reader’s awareness of what was actually said. A stutter does not enhance communication. It also calls attention to an embarrassing idiosyncrasy. (p. 35)

I thought that the narrators would find the edited version of the transcript easier to read, be more confident about how their words would appear in the study, and strike little from the transcript. I was aware, however, that the uniqueness of orality that is limited in transcription was lost further in the editing of the transcript. Portelli (1981) posits that the transcript is a reduction of the document of the oral history interview:

Oral sources are oral sources. Scholars are willing to admit that the actual document is the recorded tape; but almost all go on to work on the transcripts….The transcript turns aural objects into visual ones, which inevitably implies reduction and manipulation. (Portelli, 1981, p. 97)

Adding punctuation was an additional editing challenge given that discerning the difference between the length of pause that designate a comma versus a period is nearly impossible and the addition of any punctuation is “always more or less [the] arbitrary addition of the transcriber” (Portelli, 1981, p. 98).

The final significant decision made in response to the status of the interviewees was to use a negotiation process to settle upon the final interview transcript and the portions of that transcript that are acceptable for publication. I use the term “negotiation” instead of “member checking” (Carlson, 2010) because I believe I assumed a posture of negotiation in the process of returning the transcript to the participants for review and editing. Although I was concerned about the accuracy of the transcript, my chief concern was that each narrator was comfortable with the words that I would be using for my
analysis. This negotiation process was key in my effort to build rapport and trust with the participants (Carlson, 2010; Goldstein, 2002; K'Meyer & Crothers, 2007).

When I returned a transcript, I hoped that the participant would keep what was written and add to it; I did not want them to take anything away. I did know, however, that there was little chance that all of the data that I collected from the narrators would meet their standards without some change. In the email that I sent accompanying the edited transcript (see Appendix D), I asked that the narrator review the transcript and make the appropriate changes.³⁴ Instead of deleting passages, I also asked that they highlight any passages that they wanted to consider “off the record” and anything that they did not want directly attributed.³⁵ Using this method, I was able to easily see what material was available for use in what way. There was an instance where a participant expressed hesitation over particularly sensitive statements. There were other narrators

---

³⁴ In this email, I included a note that, if the transcript was not returned, I would assume that the transcript was acceptable as written. Each narrator had two weeks to return the transcript to me. Four days prior to the deadline in the email, I sent a reminder email. Of the 25 participants, nine did not respond regarding the edited transcript.

³⁵ Goldstein (2002) defines these terms from a more journalistic perspective: The term “off the record,” however, is often misunderstood and is often confused with “not for attribution” or “on background.” Technically, “off the record” means that you don’t know what you were just told. You cannot use the information in any way, shape, or form. You cannot use it in an unattributed quote or even to inform your work. The term “on background” means that you can use the information to inform your own work and you can use the information as a clue to search for corroborating information or for organizations or individuals who will go on the record. “Not for attribution” means that the comments or information can be used and quoted as long as the organization or individual giving out the information is not directly identified as the source of the information or quote. (p. 671)

Unfortunately, I did not find Goldstein’s explanation until after I had completed most of the interviews. I used the phrase “off the record” to refer to statements that I would not use in any way in publication. It is not possible, however, to behave as if I “don’t know what [I was] just told.” Those statements functioned more as background information.
who referred to the same situation and did not strike them from the transcript. I did not want the first participant to feel that I had ignored her or his request not to use the data, so I emailed her or him informing her or him that I would be writing about the situation using that data that I had from other participants.

In addition to these methodological decisions, I noticed two key differences in the way that I wrote. First, when writing about each of the participants and using their words, my writing took on an almost apologetic tone compared with other studies that I have done with participants who were either anonymous or not considered “elite.”

During the interviews (as in all the interviews I have conducted for various projects), it was important to me to build rapport and trust with each participant. With each analytical move, I wondered what they would think about what I wrote. Would it offend? Was I going too far? Each of these questions reverberated in my mind with each sentence. The second writing issue, related to the first, was that I often felt encumbered in writing. There were things that I could not say, not only due to statements made “off the record,” but also due to my desire not to appear critical of any of the narrators. I did not agree with all of their statements and sometimes felt that responses might have been more politically motivated than genuine. There was never a time during the interviews where I felt that the narrators were being dishonest or disingenuous, but there were moments where I wondered if some were crafting the narrative for their own or the NCTM’s advantage. Regardless of my perceptions of their motivations, I could not bring those sentiments into this narrative in an effort to maintain trust.
Reading to Get to Writing

Faced with Foucault’s methodological silence and an abundance of data, I began to read. I started with Foucault and some who had tried to explicate even just a bit of his methodology (Hook, 2005; Kendall & Wickham, 1999; Mahon, 1993; Scheurich & McKenzie, 2005; Walls, 2009). Then, I moved on to other archaeological and genealogical work (Forell, 2008; McCoy, 2005; Van Cleave, 2012; Walls, 2009) to find some direction and comfort in how other tackled the challenges that I faced. Finally, I turned to three intimidating, yet ultimately liberating sources: Janesick’s *Oral History for the Qualitative Researcher* (2010), Richardson’s (1994; 2000; Richardson & St. Pierre, 2005) “Writing: A Method of Inquiry,” and Wolcott’s *Writing Up Qualitative Research* (2009). I describe these three works as “intimidating” because of my seemingly endless struggle with being and becoming a writer. Janesick and Richardson suggest strategies such as re-writing my transcripts as poems; these strategies, although intriguing, made me uncomfortable. I did find some suggestions, however, that helped me to move beyond paralysis and into analysis and to make the necessary decisions to move the study along.

Janesick’s (2010) first instruction for analyzing oral history and documentary data seems entirely too obvious: “read and reread [the data] as the process of analysis and interpretation begins” (p. 70). While reading, she instructs the analyst to “look for

---

36 These are not the only books that moved me through analysis, but I give them credit for helping me to gain momentum. I also credit Ely, Vinz, Downing, and Anzul (1997), Ezzy (2002), and Goodall (2008) for moving me along.

37 Janesick was not the only scholar to suggest poetic transcription; Richardson (1994, 2000, 2005) and Nolan and de Freitas (2008) also mention poetry as a transcription method. I previously spent two days constructing a haiku for another manuscript, so I figured that a longer piece of poetic brilliance would take me much longer than my dissertation timeline would allow.
themes, recurring issues, and points of conflict” (p. 80). To relate the documents to the oral history data, she suggests: “it is helpful to focus on the content matter of the document and the interaction, if one exists, between the document and the participant in the oral history project” (p. 95). Richardson and St. Pierre (2005) echo Janesick’s call for an analytical process of reading and seeking out connections among the data, adding writing to the process as a means to analyze data because “writing is analysis” (p. 967).

In this chapter, St. Pierre describes her use of writing as an analytical tool:

I used writing as a method of data analysis by using writing to think, that is, I wrote my way into particular spaces I could not have occupied by sorting data with a computer program or by analytic induction. This was rhizomatic work (Deleuze & Guattari, 1980/1987) in which I made accidental and fortuitous connections I could not foresee or control. My point here is that I did not limit data analysis to conventional practices of coding data and then sorting it into categories that I then grouped into themes that became section headings in an outline that organized and governed my writing. Thought happened in the writing. As I wrote, I watched word after word appear on the computer screen—ideas, theories, I had not thought before I wrote them. Sometimes I wrote something so marvelous it startled me. I doubt I could have thought such a thought by thinking alone. (p. 970)

It was at these points of interaction that both Janesick and St. Pierre describe where analysis and writing began during the interviews and continues up to and beyond this moment.

**Shifting Focus**

In my research proposal, my stated intent was to conduct a genealogy of mathematics teacher effectiveness with the *Standards* movement. Faced with the richness of the interview data, I felt constrained by the path defined by my original questions. The current of data analysis pulled me toward something larger, but I was
reluctant to shift my focus. Wolcott (2009) reminded me that this shift was both my prerogative and my responsibility as a qualitative researcher:

Part of the strategy of qualitative inquiry—a key advantage of the flexibility we claim for it—is that our research questions undergo continual scrutiny. Nothing should prevent a research question or problem statement from going through a metamorphosis similar to what researchers themselves experience during the course of a study. Data gathering and data analysis inform the problem statement, just as the problem statement informs data gathering. (p. 36)

I could not not widen the focus of inquiry to examine the Standards movement rather than the single idea of mathematics teacher effectiveness because it would dishonor the narrators who have entrusted me with their stories and me as a researcher who is obliged to move with the data rather than forcing the data to fit into a mold that I have created. Nonetheless, being confident that my initial ideas could be of value to the mathematics education community, I do plan to revisit my proposed line of inquiry in the future.

Writing as a Method of Inquiry

Using writing as a method of inquiry positions data collection and analysis as simultaneous and entwined processes (Ely, Vinz, Downing, & Anzul, 1997; Richardson & St. Pierre, 2005), thus analysis of the interviews began during each interview. As the narrator and I talked, I was constantly comparing (Dye, Schatz, Rosenberg, & Coleman, 2000; Saldaña, 2009) the narrator’s statements with other interviews, with the Standards documents, and with other literature. I made notes of these connections during the interview and used some of these connections to create additional questions for the narrator and for future interviews. During the interviews, I altered and expanded the
categories that I had begun to form in my previous work to include data that the
narrator’s provided (Janesick, 1994).

The vast amount of documentary data made a traditional review of the literature
seem redundant, as the literature was the data and an analysis of that literature was a part
of data analysis. I use the literature throughout the study to construct arguments based
upon the oral and documentary data; but the analysis of documents is more than an
extended literature review. I consider the literature to be a dossier of documents that
have been “integrated into the field of action” (Prior, 2003, p. 2) of mathematics
education. In addition to the contents of each document, the nature of its manufacture is
also relevant to this study. I paid attention to the journals in which articles were
published and the publisher’s imprint on the books as well as the writer’s affiliation. I
continually asked questions such as “What does it mean that this article appeared in an
NCTM journal?” and “What does the writer’s reputation as a senior scholar in education
say about this piece?” I recorded and addressed these and other questions in my
researcher reflective journal (Janesick, 2004).

38 I began this inquiry in 2010 with a writing project focus on the Standards movement.
Since then, I have continued reading and writing about mathematics education history in
different settings. Through this early reading and writing, I developed several markers
that became preliminary categories for data analysis based upon the major mathematics
curriculum movements since the 1950s and the key documents and events that have
influenced both mathematics curriculum and the larger curriculum landscape.

39 I refer to the researcher reflective journal in the singular, but it is actually a
combination of a journal kept in DayOne, a password-protected computer journaling
program, and a paper journal that also holds the random post-it note, index card, and
scrap piece of paper on which I scribbled such notes. I wish that I could profess a greater
organizational strategy, but I remained true to Saldaña’s (2009) admonition: “whenever
anything related to and significant about the coding or analysis of the data comes to mind,
stop whatever you’re doing and write a memo about it immediately” (p. 33). For this
reason, pages from the small notebook that I use in church, fast food receipts, and other
The researcher reflective journal was the hub of activity for the study, housing all of my analytic memos (Saldaña, 2009)\(^{40}\) including observation notes (what I observed, mostly during interviews), methodological notes (what happened during data collection and analysis in relation to methods), theoretical notes (what connections I found to theoretical concepts), and personal notes (what I felt about the research) (Richardson, 1994). Each of these types of memos served a different purpose and moved me forward\(^{41}\) in analysis. I made observation notes during interviews to remind myself of the tone of the interview, my thoughts about participants’ statements, and links to those of other participants or literature. Through personal notes I maintained a consistent writing practice when I felt that I had nothing to say. I used methodological notes to record the ethical challenges that led me to the literature on elite interviewing. Finally, theoretical note taking helped me to wrestle with theoretical concepts as I attempted to make sense of them.

scraps of paper have become part of my researcher reflective journal. I can say, however, that no napkins are included.

\(^{40}\) According to Saldaña (2009), analytical memos include “coding memo[s], theoretical memo[s], research question memo[s], task memo[s], etc.” (p. 33). Like Saldaña, I found it a chore to separate these memos as they happened simultaneously and often overlapped. Therefore, I classify notes from literature and other thoughts as analytic memos along with those notes that Saldaña lists.

\(^{41}\) I place word “forward” under erasure here because my movement through data analysis was simultaneously progressive and regressive. This continuous forward and backward movement, although frustrating at times, brought me to a place where I have been able to bring together those thoughts in this form.
Nearly all of what you read here is a product of that researcher reflective journal.\textsuperscript{42} It was there that I recorded the observations that I made as I looked for interactions and the writing strategies that I used to “discover new aspects of [my] topic and [my] relationship to it” (Richardson, 1994, p. 516). As I read and re-read the transcripts, the literature, the NCTM documents, and Foucault’s work, I became immersed in the data, wrote, and re-wrote.

**Additional Analytical Strategies**

Although writing was my primary mode of analysis, I did use two additional strategies as I combed through the data. First, after securing the final transcripts from the participants, I continued analysis of the interviews by both reading the transcripts and listening to the audio recording of the interview as needed, writing memos along the way. I printed each transcript double-spaced with large right margins and used a combined holistic and a descriptive coding approach with both the interview transcripts and the literature (Saldaña, 2009). For holistic coding, I chunked passages of data by topic (i.e., PSSM, funding, NCTM governance); I also used descriptive coding to summarize statements in brief phrases. I also went through the data and used descriptive codes specifically related to the theoretical concepts outlined in Chapter 2. These three layers of coding were more simultaneous than subsequent.

Finally, I used divers reading strategies to look at the data differently. I began with reading the transcripts in order as they were finalized. Once I had accumulated all of the data, I began grouping the data in different ways. At one time, I would read

\textsuperscript{42} Additionally, I used the journal to record those runaway thoughts that threatened to leave me lost in some rabbit hole of distraction. My recording these thoughts, I have acknowledged them and preserved them for later consideration.
everything that I had from a particular narrator. For example, I would group Judith Roitman’s transcript with her articles “Beyond the Math Wars” (1999) and “A Mathematician Looks at National Standards” (1998). Or I would group all of the transcripts from past NCTM presidents or writers on the ASTM. Changing the context in which I read allowed me to see different things in the data, bringing me to new understandings.

**Data Reporting and Representation**

Throughout the following chapters, I use the words of oral history participants when discussing the history of the Standards movement from different vantage points. Their comments were relevant across all of the chapters. To distinguish the interview data from the written data in documents and responsive publications I initially used the narrator’s first and last name when referring to the interviews. In accordance with American Psychological Association (APA) (2010) style guidelines, I used only the last name when referring to print sources. As I wrote, however, this approach quickly fell apart.

As I was not able to interview every person who participated in writing the Standards, I relied on their writings and their words in other historical works as means to include their voices. Initially, I remained true to the above strategy where I only used first and last name when referring to my interview data, but I found myself in a crisis of representation related to those whom I did not interview. I felt that, by using only the last name for the uninterviewed, I was somehow betraying their humanity, which I was not willing to do. I decided to use first and last names in reference to any of the writers or leaders in the narrative, using APA citation practices for written sources. Therefore, if
you, reader, see a year after a name, that is a reference to written work; a page number is also a reference to written work. I also attempted to guide by using words such as “wrote” and “said” to distinguish between the two forms of data.

Summary and Conclusion

Within Foucault’s extensive body of work, he did not disclose any details about his methodological choices. In all the detail that he provided regarding the objects of his investigation, he was nearly silent regarding the process. Therefore, in order to use Foucault’s archaeology and genealogy in this study, I had to assemble my own methodological approach. In this chapter, I have described the data collection and analysis process that I assembled. I also discussed the ethical challenges that I have faced throughout.

The data for this study included the Standards documents, other official documents, responsive publications, prior historical work, and oral history interviews. I gathered the documentary data as I would sources for a literature review: I searched academic publication databases and mined reference lists from books and articles. For the oral history interviews, I attempted to contact every person listed in the acknowledgments of each of the Standards documents and secured 24 non-anonymous interviews and one written response.

The oral history narrators agreed to forego anonymity in this study. This open space presented particular ethical challenges that were both tangible and intangible. One of the more tangible choices that I made was to edit the interview transcripts to remove any speech issues that the narrators might have perceived as casting them in a negative light. I also used a negotiation process to ensure that the participants were comfortable
with the words that were available to me to use. Less tangible, however, were the choices that I made (and continue to make) as I wrote about the participants and used their words. Even during the interview, I experienced some hesitation as I was reluctant to press or challenge. The result of these ethical issues is a manuscript that is timid in places because I did not want to take too much liberty with the words with which the narrators had entrusted me.

In the next two chapters, I present the historical narrative that I constructed. This narrative is not comprehensive. There are topics that I touched briefly and some that I avoided altogether for fear of finding myself in a proverbial rabbit hole. In Chapter 4, I begin with some historical background for mathematics education, NCTM, and the Standards movement. Through this background, some of the conditions of emergence for the Standards become apparent. I continue in Chapter 5 to examine the construction of the Standards documents themselves, discussing some conditions of emergence for each document and some of the power relations that influenced their development and proliferation through the mathematics education community.
CHAPTER 4

SETTING UP THE STANDARDS

As a study of conditions of emergence rather than origins, “archaeology begins with context setting” (Cotton, 2004, p. 225). The context for the Standards movement includes the shifts in education and mathematics education prior to the CESSM. Mathematics education in the 20th century can be characterized by two separate yet interlaced debates: progressive education43 versus academic mathematics44 and mathematicians versus mathematics educators. Both of these debates have residue in both the development of curricula and of the profession. In this chapter, I situate both mathematics education and the Standards movement within a historical context using these two debates as a framework. I discuss education reform in the 20th century and the

43 Urban and Wagoner (2009) position the progressive movement in education as part of a larger socio-political, -cultural, -historical progressive turn in the early 20th century, although the term was used in the 1890s (Kliebard, 2004). Like the larger movement, progressivism in education was complex and often contradictory. Although the means varied greatly, the goal was to extend the nature and purpose of schooling. Kliebard (2004) describes progressivism as a chaotic “hodge-podge of incompatible practices laid side by side...analogous to a chemical mixture in which different elements were thrown together but still retained their own characteristics” (p. 190). Urban and Wagoner use descriptions from Cremin and Katz to outline characteristics of progressivism in education including: “the extension of educational opportunity...expansion and reorganization of the curriculum...addition of the extracurriculum...reorganization of classes according to student testing...pedagogical innovations...change in the political control of education...[and] the importing of scientific management into school administration” (pp. 227–228).

44 I define academic mathematics as mathematics that is done as art or mental exercise without concern for the relevance of that mathematics outside of the exercise. Davis and Hersh (1981) argue that the idea of academic, or pure, mathematics is central to the dominant ethos of twentieth-century mathematics—that the highest aspiration in mathematics is the aspiration to achieve a lasting work of art. If, on occasion, a beautiful piece of pure mathematics turns out to be useful, so much the better. But utility as a goal is inferior to elegance and profundity. (p. 86)
emergence of mathematics education as a discipline and the NCTM as a professional organization. I conclude the chapter with a discussion of NCTM’s initial moves to position responsibility for the statues of mathematics education within the mathematics education community with the Priorities in School Mathematics (PRISM) report (NCTM, 1981) and An Agenda for Action (NCTM, 1980).

The Challenge of Public Education: Progressive vs. Academic Mathematics

After the Civil War, the population attending schools began to change as states passed compulsory education laws (DeVault & Weaver, 1970; Kliebard, 2004; Urban & Wagoner, 2009) and those whom G. Stanley Hall (as cited in Kliebard, 2004) described as the “great army of incapables” (p. 12) began to attend schools. This change in the school population was the impetus for curriculum reform as part of the public agenda “and it was in this context that our professional forebears set the standard for failure of curriculum reform that is our legacy” (Stanic & Kilpatrick, 1992, p. 408). At the time, mathematics was considered more of a mental discipline “learned primarily for its own sake and for the purpose of training the faculties of the mind” (Osborne & Crosswhite, 1970, p. 156) than a tool. Stanic and Kilpatrick (1992) count the turn of the twentieth century as one of two significant historical periods in mathematics curriculum reform (the second is the time after Sputnik that I discuss later). They posit that these two moments have functioned as “‘fault lines’ in the field of mathematics education” that have “left certain residues in the curriculum” (p. 408).

45 The overt cynicism in Stanic and Kilpatrick’s statement is, perhaps, a result of the numerous attempts (I mention some of them in this chapter) at mathematics curriculum reform that have not resulted in significant opportunities for mathematical success for those students who, in any given historical moment, have not been considered school-worthy (Buckley, 2010; Bullock, 2012; Lubienski & Gutiérrez, 2008).
The Committee of Ten

The National Education Association’s (NEA) high school study committee, the Committee of Ten, convened at Harvard University in December of 1892 to discuss, among other issues, “the extent to which a single curriculum...would be feasible or desirable in the face, not only of larger numbers of students, but, more importantly, of what was often perceived to be a different type of student” (Kliebard, 2004, p. 8). The committee recommended four courses of study with equal status: English, Modern Languages, Latin-Scientific, and Classical (Kliebard & Franklin, 2003). As “the first national group to consider the goals and curriculum for mathematics education” (Jones & Coxford, 1970, p. 33), the mathematics subcommittee of the Committee of Ten established a rather traditional program of algebra, geometry, advanced algebra, and trigonometry as the course progression for mathematics in the United States for all four domains of study. According to Kliebard and Franklin (2003), the committee’s reasoning for recommending rigorous college preparatory mathematics for all students was “so far as they were concerned, every student regardless of probable destination deserved to have his or her reasoning power strengthened by the kind of mental exercise that intensive study of mathematics provided” (p. 402). Critics, however, were concerned that the recommended curriculum would not meet the needs of those students who were now required to come to school.

The Committee of Ten report marked the first major public attempt at curriculum standardization. Different stakeholder groups who had an interest in education began to form during this time. These interest groups became influential voices in curriculum reform work throughout the 20th century (Kliebard, 1982). Stanic and Kilpatrick (1992)
refer to these interest groups as a “constellation of forces…preoccupied with a limited and ill-defined agenda” (p. 408). Kliebard continues:

> At any given time, we do not find a monolithic supremacy exercised by one interest group; rather we find different interest groups competing for dominance over the curriculum and, at different times, achieving some measure of control depending on local as well as general social conditions. Each of these interest groups, then, represents a force for a different selection of knowledge and values from the culture and hence a kind of lobby for a different curriculum. (p. 17)

In mathematics education, these interest groups included mathematicians, who made up the mathematics subcommittee of The Committee of Ten.

> The recommendations of the mathematics subcommittee of The Committee of Ten were a mainstay for mathematicians and conservative mathematics educators throughout the 20th century and continue in current debates. The boom of industrialization that hit the United States in the first few decades of the 20th century presented an opportunity to reconsider what the critics of the Committee of Ten report had argued at the turn of the century. The Committee of Ten’s approach to school mathematics left little room for those “incapables” who were coming to school without the necessary academic sophistication and was insufficient for the “new industrialism” (DeVault & Weaver, 1970, p. 110). Industry did not require academic mathematics of its workers and was not concerned with the mental exercise that it provided, instead

---

46 In 2008, the state of Georgia adopted the Georgia Performance Standards, an integrated curriculum that moved away from the traditional Algebra I, Geometry, Algebra II, Precalculus sequence to a sequence of integrated courses titled Math 1, Math 2, Math 3, and Math 4. This change was met with great outrage as parents and other stakeholders called for a return to the more traditional form of mathematics with which they were familiar. A large part of the argument for at least changing the course names was that colleges and universities were looking for courses with traditional names. The public outcry drew the attention of the media and the State Board of Education in 2010 and many school systems changed to course names such as Integrated Algebra I and Integrated Geometry.
preferring a more utilitarian approach to school mathematics that would support the needs of the growing industrial workforce (Kliebard, 2002; Kliebard & Franklin, 2003; Popkewitz, 1988).

**The Cardinal Principles Report**

In 1918, Clarence Kingsley, a Brooklyn, New York mathematics teacher, issued *The Report of the Commission on the Reorganization of Secondary Education* (more commonly known as *The Cardinal Principles Report*) as another entry in the curriculum debate that began with the Committee of Ten report (Kliebard, 2004). *The Cardinal Principles* report established seven aims of secondary education: health, command of fundamental processes, worthy home membership, vocation, citizenship, worthy use of leisure, and ethical character (Donoghue, 2003; Urban & Wagoner, 2009). In a move away from traditional school subjects toward education as a mechanism for social efficiency (Kliebard & Franklin, 2003; Urban & Wagoner, 2009), “this report set the stage for the high school to become the major public institution for the socialization of youth through school dances, athletics, student government, clubs, and other extracurricular activities” (Spring, 2006, p. 21). In mathematics, the report recommended that algebra and geometry be mandatory for some students while advocating at least one year of mathematics for all students (Walmsley, 2007). *The Cardinal Principles*, both as a document and as representative of the progressive movement of the time (Urban & Wagoner, 2009), threatened mathematics’ curricular position in schools (Garrett & Davis, 2003; Walmsley, 2007).
Mathematics Education Emerges: Mathematicians vs. Mathematics Educators

Despite the recommendations of *The Cardinal Principles* and the growing changes in school population, the mathematics community was not willing to succumb to progressive education’s threat to unseat academic mathematics in schools. This threat, whether real or perceived, caused the mathematics education community to reconsider its structure. There were many local and regional associations dedicated to mathematics education, but they felt increasingly powerless against larger organizations such as the NEA.

In response to the Committee of Ten report, mathematicians with an interest in education and educators with training in mathematics “laid the foundation for the profession of mathematics education that was to emerge in the early years of the twentieth century” (Donoghue, 2003, p. 159). At the beginning of the 20th century mathematics teacher education began to trend toward a four-year, post-secondary model as stakeholders began to question the number of mathematics courses required of teachers during training as the 19th century teacher was considered “ill-trained, harassed, underpaid, and often immature” (Kliebard, 1982, p. 16). E. H. Moore, president of the American Mathematical Society (AMS) at the turn of the twentieth century, delivered a controversial presidential address focused on issues of secondary and college mathematics teaching. In reference to the teacher, Moore commented:

> Teaching must become more of a profession. And this implies not only that the teacher must be better trained for his career, but also in his career he be given with greater freedom greater responsibility. (as cited in Donoghue, 2003, p. 169)

In response to Moore’s platform of teacher professionalism, the AMS offered membership to secondary school teachers and began to plant regional sub-organizations
for teachers such as the New England Association for Mathematics Teachers and the Association of Teachers of Mathematics in the Middle States and Maryland (Donoghue, 2003).

Granting membership in the AMS to teachers in the early 1900s was evidence of what Donoghue (2003) identifies as “a period of consolidation for the mathematics education community” (p. 181). Although the membership roster welcomed mathematics teachers, the structure of the organization was not meeting the needs of its new constituency. The AMS’ publications focused increasingly on research in mathematics rather than pedagogy, becoming less relevant to secondary mathematics teachers and creating a need to reach out to teachers in new ways.

After an unsuccessful attempt to gain support for a monthly pedagogical publication from the AMS, Herbert Slaught, a student of E. H. Moore, formed the Mathematical Association of America (MAA), an organization situated between mathematics and mathematics education (Donoghue, 2003). The MAA’s National Committee on Mathematical Requirements, a group of college mathematics professors, was formed to defend secondary school mathematics. Local and regional teacher organizations appreciated the national muscle, but felt that “relying solely on a college-initiated committee to defend the position of mathematics in the secondary school cast their own organizations and the very profession they promoted into a subsidiary role” (Donoghue, 2003, p. 187).

The need for a national organization formed by mathematics teachers prompted the Men’s Mathematics Club of Chicago to approach other groups about their interest in forming such an organization (Donoghue, 2003). At an NEA meeting in Cleveland, Ohio
in 1920, 127 mathematics teachers from 20 states chartered the NCTM. At its founding, NCTM’s primary goal was to rescue mathematics in schools from progressive education reformers who sought to remove mathematics from the core curriculum. In the first NCTM-sponsored issue of *Mathematics Teacher*, C. M. Austin, the inaugural NCTM president, wrote:

> During the same period [1910–20] high school mathematics courses have been assailed on every hand. So-called educational reformers have tinkered with the courses, and they, not knowing the subject and its values, in many cases have through out mathematics altogether or made it entirely elective. The individual teachers and local organizations have made a fine defense to be sure, but there could be no concerted action. Finally, the American Mathematical Association…came to the rescue and appointed a committee to study the situation and to make recommendations. Already two valuable reports have been issued and others are in preparation. The pity of it is that this work, wholly in the realm of the secondary schools, should have to be done by an organization of college teachers. True they have generously called in high school teachers to help, but the fact is that it remained for the college people to initiate the work…. [NCTM was formed] to help remedy the situation. (as cited in Osborne & Crosswhite, 1970, p. 194)

Austin continued to address NCTM’s priorities:

First, it will at all times keep the values and interests of mathematics before the educational world. Instead of continual criticism at educational meetings, we intend to present constructive programs, by friends of mathematics. We prefer that curriculum studies and reforms and adjustments come from the teachers of mathematics rather than from the educational reformers. (Austin as cited in Donoghue, 2003, p. 187)

Austin’s statements established the NCTM as the national face of and advocate for the pre-college mathematics teacher through the curriculum debates that would follow. He

---

47 Currently, *Mathematics Teacher* is an NCTM publication for secondary mathematics teachers. Originally, the Association of Teachers of Mathematics in the Middle States and Maryland published *Mathematics Teacher*. NCTM assumed control of the publication in 1921 (Jones & Coxford, 1970; Gates, 2003).
also positioned mathematics education as something that generalist educators devalued for lack of understanding (or, perhaps, lack of ability).

Lindquist (2003) provides a brief description of NCTM’s structure and governance:

NCTM is governed by an elected Board of Directors consisting of the president, either the president-elect or the immediate past president (depending on the election cycle), and twelve other members. NCTM functions through volunteers who serve on standing committees, editorial panels, and task forces and through a professional headquarters staff. (p. 820)

The Executive Director leads the NCTM staff. Each member of the Board of Directors (the Board) serves a three-year term. Each year, some members cycle onto the Board as others cycle off;48 this structure ensures continuity. Another measure in place to ensure continuity of leadership is the presidential structure. After election, each president serves one year as president-elect, two years as president, and one year as immediate past president (see Appendix E for lists of NCTM presidents, members of the Board of Directors, and Executive Directors).

NCTM continues to position itself as the voice of mathematics education and supporter of teachers. It is “the world’s largest organization dedicated to improving mathematics education in prekindergarten through grade 12” (NCTM, 2013 About NCTM section). In its mission statement, NCTM (2012) positions itself as “the public voice of mathematics education, supporting teachers to ensure equitable mathematics learning of the highest quality for all students through vision, leadership, professional development, and research” (NCTM Mission Statement section). It is clear in this mission that the organization considers itself as a resource for teachers rather than an

48 In his interview, Lee Stiff referred to these groups as “classes.”
organization of teachers. I will address shifts in NCTM’s position further later in this chapter and in chapter five.

**Reconsidering the Sputnik Effect**

The entwined debates between progressivism and academics and mathematics and mathematics education converged in the mid-20th century when reform activity in mathematics education accelerated. The most common causal explanation for the flurry of reform activity in the late twentieth century is the launch of the Russian satellite *Sputnik* on October 5, 1957 and the subsequent public reaction in the United States. This event, albeit significant, is not sufficient as a “single-factor explanation” (Kliebard, 2002, p. 135). Prior to *Sputnik*, life adjustment education, a stance based in progressive education that positioned high school as a place of preparation for functional living that would best serve the majority of “average” students who were neither intellectually not vocationally inclined, gained momentum in the late 1940s with the support of the National Association of Secondary-School Principals (Kliebard, 2002; 2004). The major intent of the life adjustment movement was to expand the scope of the school curriculum to address preparation for post-secondary education, preparation for work, doing an effective day’s work in school, getting along well with other boys and girls, understanding parents, driving a motor car, using the English language, engaging in recreational activities, and so on [as] representative areas encompassing real problems faced by youth. (Collier as cited in Kliebard, 2004, p. 254)

However, the proponents of life adjustment education were not entirely altruistic in their motives. President Roosevelt’s New Deal of the 1930s put in place work relief initiatives such as the National Youth Administration and the Civilian Conservation Corps to attend to the unmet needs of poor children (Kliebard, 2002; Tyack & Cuban, 1995; Urban &
that “threatened the preeminence of the public secondary school as the institution where youth belonged” (Kliebard, 2002, p. 135). Therefore, life adjustment education represented an effort to emphasize the viability and the relevance of the public high school for all students.

In response to the life adjustment education movement, the post-secondary academic community aligned itself with the original Committee of Ten recommendations and took exception with the anti-intellectual tone of the life adjustment movement, arguing that “schools had no right to decide what roles their students eventually should play in society and, therefore, determining the curriculum on the basis of probable destination of students should have no place in school policy” (Kliebard, 2002, p. 58). This debate solidified a rift between schools and the academic community around the schools’ intellectual responsibility that had been building for about 100 years (Kliebard, 2002). The 1940s and 1950s were marked with “vitriolic attack[s] on the anti-intellectualism of the American education establishment” (Kliebard, 2002, p. 134).

Decentering Sputnik as the root cause of recent curriculum reform activity does not negate its influence. Instead, it makes apparent a debate within U.S. education that happened through Sputnik rather than because of it. The public response to Sputnik and the fear associated with the Cold War prompted a question related to education: “Was American schooling too soft, too inefficient, too unselective to sustain the nation in its conflict with Russia?” (Tyack, 1974, p. 270). This question created a perfect scenario for critics of life adjustment education. The response to the launch propelled mathematics, science, and foreign language education—considered to be “defense-related fields” (Draft of Educational Development Act of 1958 as cited in Kerr-Tener, 1987, p. 476) that are
essential “for the nation’s military and economic preeminence” (Schoenfeld, 2004, p. 256)—to the forefront of the national conversation in a time when “many students could graduate from high school having taken no high school level mathematics” (Walmsley, 2007, p. 25). The paranoia surrounding the Cold War created an atmosphere from which *Sputnik* could create widespread “math panic” (Sebelius, 1987 para. 1) in the US (Schoenfeld, 2004; Urban, 2010; Walmsley, 2007). According to Scandura (1970), *Sputnik* “gave realization to the American people that mathematics education in this country was woefully inadequate” (p. 265).

Proponents of a more intellectual curriculum that hearkened back to the Committee of Ten’s report used this opportunity to develop the National Defense Education Act of 1958 (NDEA), an unprecedented move by the federal government to assert authority over public education in the United States (Urban, 2010; Urban & Wagoner, 2009). Title III of NDEA specifically addressed “strengthening of science, mathematics, and foreign language instruction in secondary schools” (Urban, 2010, p. 2) by allotting funding to address instruction in these areas on many levels, although these funds did not reach the classroom. A 1964 survey of selected states by the Pennsylvania State University Office of Educational Research revealed that the results of NDEA funds indicated an increase in: (1) the number of mathematics supervisors on the state level, (2) the number of mathematics education publications issued by the state departments of education, and (3) the amount of money budgeted for state supervision of mathematics education. (Davison & Schuler, 1964, p. 89)

There was not, however, an increase in spending for mathematics teachers, mathematics teacher education, professional development, or curriculum development. *Sputnik*, the
NDEA, and the growing dissent with progressive education strategies (Fey, 1978) laid the groundwork for consideration of new approaches to mathematics education with emphasis on “‘modern’ content” (Schoenfeld, 2004, p. 257).

**New Math**

The increased attention to mathematics education resulted in two major mathematics curriculum reform movements in the decades following *Sputnik* and the NDEA—New Math and Back to Basics. New Math was a direct counter to the progressive style of mathematics education that centered on socially relevant applications of mathematics outside of the discipline (Glennon, 1976). Those who developed New Math curricula virtually ignored anything outside of “pure” mathematics (Usiskin, 1997a) in response to “a demand for highly trained people in mathematics, science, and engineering” (Usiskin, 1997b, p. 63). There was, however, a mismatch between the rhetoric surrounding New Math and the realities of implementation. SAT scores plummeted and many blamed New Math. Zelinka (1980), a high school mathematics teacher, wrote that this blame was misplaced:

> However, to blame the “New Math” for declining scores is entirely wrong. In this vast country many areas unfortunately were not touched by the “New Math”; names like Max Beberman and E. G. Begle and the significance of the SMSG [School Mathematics Study Group] are unknown…Alas, the training of teachers for this task, limited to begin with, soon left much to be desired and finally was eliminated. At a 1970 Conference on the Goals for Mathematics Education in the Seventies, Dr. Begle remarked, “Our ‘New Math’ experience of the 1960’s has taught us a great deal about how to teach better mathematics, but very little about how to teach mathematics better.” (p. 431)

In addition to the lack of appropriate training and instructional support that Zelinka and Begle discuss, there exist several theories about why New Math was short-lived. In a letter to the editor of *Science News*, Sebelius (1987) positioned the “math
panic” after *Sputnik* as a manufactured crisis that caused a real crisis in mathematics education: “The ‘new math’ cure for a nonexistent crisis is now seen as the cause for a real one today” (p. 147). Gibney and Karns (1979) sum up New Math’s demise as a case in which goals were simply too ambitious to allow any opportunity for success. Such lofty goals resulted in little actual change in mathematics instruction over this period (Price, Kelley, & Kelley, 1977) that leaves the legacy of New Math as “a waste of time and money” (Gibney & Karns, 1979, p. 357). Schoenfeld (2004) surmises that one of the lessons learned from the New Math movement is that, “for a curriculum to succeed, it needs to be made accessible to various constituencies” (Schoenfeld, 2004, p. 257) including teachers and parents.

**Back to Basics**

The Back to Basics movement followed New Math as the response to its inaccessibility and failure to equip students with basic consumer computation skills (Gibney & Karns, 1979; Walmsley, 2007; Zelinka, 1980). Focused on skills and procedures, the Back to Basics curriculum resembled that of the pre-*Sputnik* era and yielded disappointing results (Schoenfeld, 2004). Morris Kline, a mathematics educator at New York University, “was the first and loudest voice” (Kilpatrick, 1997, p. 956) in the campaign for Back to Basics with his 1974 book *Why Johnny Can’t Add: The Failure of the New Math* (Fey, 1978). The Back to Basics movement was based on an instructional approach defined by “drill, repetition, and hard work” (Cheek & Castle, 1981, p. 265) rather than problem solving. The textbook—with fewer words and more practice problems—became the central instructional resource (Gibney & Karns, 1979). It was during this time that the curriculum materials industry shifted from simple textbooks
to complete instructional systems that included supplementary and audiovisual materials (Price et al., 1977).

**Paving the Road to Standards**

In most narratives of the history of education in the United States in the 20th century, the next landmark event of the 1980s is *A Nation at Risk* (The National Commission of Excellence on Education, 1983), which, like *Sputnik*, has been placed at the center of mathematics education reform conversation. Mary Lindquist (NCTM president, 1992–1994) also disputed the primacy of *A Nation at Risk* in the *Standards* narrative in her interview for the *Bold Ventures* project:

> You can look at the *Standards* as growing in a very natural way out of the concerns of mathematics education. You can trace the *Standards* back to *An Agenda for Action* (NCTM, 1980), back to the NCSM (1978) statement that addressed the back-to-basics movement, and back to the 1975 NACOME report. The *Standards* came mainly from within mathematics education rather than as a reaction to *A Nation at Risk* (NCEE, 1983) or federal policies. (McLeod et al., 1996, p. 37)

When asked in his interview about the accuracy of positioning *A Nation at Risk* as a significant historical marker in mathematics education, John Dossey, president of NCTM from 1986 through 1988, responded:

> It was another part of the large national discussion that, I think, promoted the movement towards *Standards* that clearly, more than anything, started a background for curricular change. NAEP [The National Assessment of Educational Progress] was probably as important coming parallel to *A Nation At Risk*. The next year the National Science Board’s Commission on Precollege Education in Mathematics, Science, and Technology came out. This report was more curriculum-oriented and was based on subject matter expert panels. NCTM participated alongside the other professional groups in the Conference Board of the Mathematical Sciences framing of the document *The Mathematical Sciences Curriculum K-12: What Is Still Fundamental and What Is Not?* This report was jointly developed by the mathematics education and mathematics communities….So *A Nation at Risk*, I think, provided outside impetus for doing this even though in the
math and math ed. communities there was already movement toward this coming from the *Agenda for Action*.

Dossey described several activities in mathematics education that predated *A Nation at Risk*. In addition to the projects that Dossey described, NCTM published two precursors to the *Standards* movement: the *Priorities in School Mathematics* (NCTM, 1981) report and *An Agenda for Action* (NCTM, 1980). It would seem that *A Nation at Risk* turned the national spotlight on issues in which mathematicians and mathematics educators were already deeply entrenched.\(^{49}\)

From its founding in 1920 through the 1960s, “NCTM played an important but usually secondary role in curriculum recommendations” (McLeod et al., 1996, p. 18) with mathematicians from colleges and universities taking the primary position. McLeod and colleagues (1996) assert that the NCTM had established a traditionally passive position related to policy:

> Within NCTM a tradition had developed that worked against having the organization take a leading role in policy recommendations. Up until the 1970s, many leaders thought that NCTM should not take positions that might be opposed by some of its members. The publication of *An Agenda for Action* (NCTM, 1980), with its brief recommendations on curriculum and teacher professionalism was a significant change. (pp. 18–19)

One theme that was evident in nearly all of the oral history interviews conducted for this study was that the process of creating and disseminating the *Standards* was well

---

\(^{49}\) From this point, my discussion of mathematics education focuses primarily on the activities of the NCTM. I have chosen to narrow the scope of the narrative in this way because the launching point of this study was the NCTM *Standards* documents. I am aware that this approach excludes activities of other organizations that were also important to mathematics education. It is for this reason that I refer to this study as *a* history rather than *the* history. In the future, I will investigate other organizations and entities that have taken on the issue of mathematics education reform and bring those narratives together with this one.
coordinated. Lee Stiff, president of NCTM from 2000 to 2002, attributed this careful planning and execution to learning the lessons of prior reform efforts:

I know the people involved in the Standards movement and what I was always impressed by [was] they learned the lessons of past reform and tried to incorporate that into this NCTM Standards reform. The lessons of past reform [were] you didn’t bring everybody on board before you release something new. You didn’t ask the society about its input before you did something new. You didn’t ask government before you did something new. You used research before you did something new. You know, each of the previous reforms might have done one or the other of those things but they didn’t try to incorporate all of those things and I think the NCTM Standards incorporated all of those things and that was what was really unique about it.

The lessons of the past that Stiff described prompted NCTM to enter the 1980s with an unprecedented plan for reform that began with the Priorities in School Mathematics (PRISM) study.

**The PRISM Report**

The PRISM report (NCTM, 1981) was a summary of the PRISM study that was conducted immediately prior to the release of An Agenda for Action (published one year earlier). According to John Dossey, “NCTM got funding from the National Science Foundation to basically sample the field on what were priorities for moving the field forward in the coming years.” In this study, NCTM sampled nine populations including both “professional” samples from its journal readership (i.e., K–12 and two-year college mathematics teachers and mathematicians) and “lay” samples (i.e., school and district administrators and representatives of parent organizations) (NCTM, 1981, p. 5). The rationale for this sampling strategy was that “final implementation of curricular change depends on the individual preferences of teachers, administrators, and parents at the local school level” (p. 33). The sample population participated in two surveys: “a survey of
preferences for alternative content topics, instructional goals, resources, methods, provisions for particular groups of students, and ways of using calculators” (p. 3); and a survey of “priorities of curriculum change or for methods of addressing problems in mathematics education” (p. 4).

With the PRISM study, NCTM created a foundation for its activities in the 1980s. The study functioned as a barometer for “predicting what curriculum changes might be readily adopted and which ones might meet with resistance” (NCTM, 1981, p. 3). The published report summary highlights how the results of the report align with the recommendations of An Agenda for Action and concludes with a statement that “implementing the recommendations is not solely NCTM’s task—it is a task for all concerned about the mathematics children learn in school” (p. 33) calling for a collaborative approach to mathematics curriculum reform.

An Agenda for Action

NCTM used the results of the PRISM study to make recommendations for the direction of mathematics education in the 1980s (NCTM, 1981), a time of national economic crisis and further moves by the NCTM to return control of the mathematics education conversation to mathematics educators. Those recommendations came in the form of An Agenda for Action: Recommendations for School Mathematics of the 1980s (NCTM, 1980), a “broad statement of basic mathematical skills among prominent mathematics educators and their professional organizations” (Cheek & Castle, 1981, p. 274). Mari Muri described An Agenda for Action as “kind of a 1-pager alerting people that ‘We’ve got to pay more attention to mathematics and here are some ways to do that.’” NCTM proposed that problem solving should be central to school mathematics
and that those students who had difficulty with basic computational skills should still learn problem solving skills and use technology to handle the computation (Abrantes, 2001). They argued for a more comprehensive definition of basic mathematical skills “to encompass more than computational facility” (NCTM, 1980, p. 1) in opposition to Back to Basics’ “tendency to place a low ceiling on mathematical competence” (p. 6).

In the preface, the NCTM Board of Directors writes:

The National Council of Teachers of Mathematics, as an organization of professional educators, has a special obligation to present its responsible and knowledgeable viewpoint of the directions mathematics programs should be taking in the 1980s…The recommendations are responsible to the profession and to the public since they represent a very broad base of belief about objectives and priorities. The Council, funded by the National Science Foundation, conducted an extensive survey of the opinions of many sectors of society, both lay and professional. The project was called Priorities in School Mathematics (PRISM). Such opinion surveys do not in themselves generate recommendations, but a professional organization, if it is to be responsible, must give them serious consideration as it develops its best-considered advice to society concerning future directions for educational programs. These recommendations are not the end of our efforts but a beginning. They represent an agenda for a decade of action, and we call on all interested persons and groups to join us in a massive cooperative effort toward better mathematics education for all our youth. (pp. i–ii)

This statement ends with another call to the community of interested parties in mathematics education to cooperate with NCTM’s “decade of action.” Positioning the effort as cooperative rather than collaborative is further evidence of NCTM’s forethought in planning its activities in the 1980s and the organization’s intent to be the leader in future mathematics curriculum reform. With this statement, NCTM created the necessary momentum to move into the development of the *Standards.*
A Decade for Mathematics

An Agenda for Action (NCTM, 1980), was a statement indicating “that NCTM wanted to provide direction to the field, to assert its authority and share its expertise with a higher level of intensity than had been its custom” (McLeod et al., 1996, p. 24). It also provided a direction that would guide the organization through the next few decades. Despite the magnitude of the effort in the eyes of NCTM, An Agenda for Action did not receive widespread attention. McLeod and colleagues (1996) cite an unnamed state mathematics supervisor who observed that “The Agenda for Action in 1980 was the best known document, literally a little pamphlet, 5x7. It was nice, but…it didn’t have a lot of heft, and people weren’t paying much attention” (p. 25). Regardless of the public perception of this initial document, NCTM used it as a springboard. Shirley Hill, president of NCTM (1978–1980) wrote “the decade of the 1980s is a decade for mathematics” (as cited in McLeod et al., 1996, p. 25).

The “decade of mathematics” was hindered, however, by ongoing federal tension regarding support for education. The role of the federal government in education has been a consistent question throughout the history of education in the United States (Urban & Wagoner, 2009). I have outlined several attempts at national discussions on curriculum reform, but there was never a federally sponsored curriculum. The National Defense Education Act (NDEA) was an unprecedented reach of the federal government into public education. The National Science Foundation (NSF), founded in 1950, was the primary means for federal support of curricula. The NSF did fund curriculum development in mathematics and other disciplines after Sputnik, but the climate related to

50 I discuss further NCTM’s unfolding as a political organization in Chapter 6.
national support of curriculum had changed significantly by the 1980s (Schoenfeld, 2004).

In his article “The Math Wars,” Schoenfeld (2004) discusses the NSF’s role and the reasons for their discontinuation of funding. He credits “Man: A Course of Study” (MACOS) with causing the hesitancy toward curriculum funding from the NSF. MACOS was an evolution-based elementary science curriculum supported by the NSF in the 1970s that sparked a public controversy that was considered “the worst political crisis in NSF history” (Lappan & Wanko, 2003, p. 911). Schoenfeld (2004) writes:

The tide regarding federal funding of innovative education efforts had turned, thanks to a political controversy over an NSF-supported elementary school science and social science curriculum called Man: A Course of Study (MACOS). MACOS met with initial success, and then a strong political backlash….In the 1980s, the NSF did not dare 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)

During our interview, I asked Alan Schoenfeld about the NSF’s reticence to fund curriculum efforts. He responded:

They had been told by Congress that if you ever do anything that smacks of national standards we’ll cut your funding off….It was that strong. This was the MACOS [Man: A Course of Study] scandal; it was a social studies curriculum that said that evolution was a fact. A preacher in Florida got a hold of this [and] he started railing against it. Congress got up in arms and they said to NSF “Don’t go anywhere near a national curriculum again or that’s it, you’ve had it in terms of funding”…so basically for the 15 years after that NSF paid attention to education but it did so in a way that wouldn’t cause any problems with Congress. They spent a lot of money on professional development, on teacher workshops. NSF had a couple of divisions with relatively small amounts of funding for research in science and math education and they stayed away from anything in curricular terms.

NSF support for education was further undermined in 1982 when the Reagan administration terminated funding K–12 mathematics and science education in the NSF
budget (McLeod et al., 1996). Lobbyists successfully thwarted the administration’s efforts to eliminate the Department of Education, causing McLeod and colleagues (1996) to assert that “mathematics and science education were not effective enough in their lobbying efforts” (p. 26). Although the well of federal funds was dry, the interest in mathematics education reform was not. Lobbyists were able to establish the Commission on Precollege Education in Mathematics, Science, and Technology through the National Science Board. In their 1983 recommendations for securing federal funding for education reform, the commission “recommended that professional organizations should take responsibility for directing educational change in their fields” (McLeod et al., 1996, pp. 26–27). In the same year, the National Commission on Excellence in Education released *A Nation at Risk* (1983), a report whose introduction is evidence of its rhetorical power that drew great media attention.

Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur—others are matching and surpassing our educational attainments. If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves….We have, in effect, been committing an act of unthinking, unilateral educational disarmament. (p. 9)

The recommendations of the Commission on Precollege Mathematics, Science, and Technology and *A Nation at Risk* combined with the United States Department of
Education Office of Education Research and Improvement’s 1983 recommendations “for a task force to help develop guidelines for mathematics curriculum” (McLeod et al., 1996, p. 28) to create the conditions of possibility (Walshaw, 2007) for the Standards.

In late 1983, the United States Department of Education Office of Educational Research and Improvement sponsored a conference at the University of Wisconsin entitled “School Mathematics: Options for the 1990s” (McLeod et al., 1996). The word “Options” in the conference title and subsequent published reports we strategic because, according to an NCTM leader interviewed by McLeod and colleagues (1996):

We were told by the Department of Education that we couldn’t use their name or their funds [for a report on standards]. At that point in 1984, the federal government was not about the use the words standards, national standards. (p. 29)

Although the government was not willing to step into the curriculum arena, mathematicians and mathematics educators agreed that, in the light of the failure of both New Math and Back to Basics, something had to be done to refocus. In his interview for the Bold Ventures study, James Gates (NCTM Executive Director, 1976–1995) discussed moving ahead without federal support:

We charged ahead. Bear in mind that we didn’t go to the federal government for [funding to develop standards] because of this concern [about the government’s reticence to fund curriculum efforts]. I believe that the federal government at that point was taking the position that the use of the term national standards was politically dangerous. (McLeod et al., 1996, p. 29)

With an Agenda for Action, a 29-page pamphlet, “NCTM was jumping into the breach:

There was a nationwide problem and no federal mechanism for dealing with it” (Schoenfeld, 2004, p. 265).
The challenge in Back to Basics conversations had been actually defining what the basics were. John Dossey stated that *An Agenda for Action* was an effort to define “basics” for the community:

NCTM felt it was time to say that the basics is more than just algorithmic work but they wanted to say it in a way that didn’t make a kind of bivariate comparison between what had been and what was being asked for but rather to really say “What are the basics?” So the *Agenda for Action* was that statement and it was well received. It came out and at the same time the National Council of Supervisors of Math[ematics] also released a statement about the basics that was very, very supporting and very, very parallel. These two documents, I think, energized the field to think outside the box about the basics, about computational tools, about the role of problem solving, and it moved, I think, the *Standards* process off of square one. The *Agenda for Action* wasn’t a *Standards* document per se; it was one that began to build a framework of what might be structural parts of a *Standards* document and also about what types of things were expected from curricular content.

The National Council of Supervisors of Mathematics (NCSM) publication to which Dossey referred was a “list of ten basic skills important in mathematics” (Coxford, 2003, p. 610). Coxford (2003) positions the NCSM’s list as “an initial voice that would build in volume and intensity to *An Agenda for Action*” (p. 610). Although it contained more detail than its predecessor from NCSM, *An Agenda for Action* was not comprehensive.

In his interview for the *Bold Ventures* study, NCTM Executive Director James Gates (1976–1995), echoed Dossey’s sentiments about *An Agenda for Action*, describing it as “a set of bones without much meat” (as cited in McLeod et al., 1996, p. 19).

NCTM established its goals for the 1980s in *An Agenda for Action* with the support of the PRISM study. *A Nation at Risk* (The National Commission of Excellence on Education, 1983) and *Educating Americans for the 21st Century* (National Science Board, 1983) positioned the United States in a crisis of global competitiveness (McLeod et al., 1996) and “blamed public schools for America’s difficulties in competing in world
markets” (Spring, 2006, p. 192). This crisis, whether real or perceived, generated the momentum needed for large-scale curriculum change. NCTM was poised to “[respond] to the call for reform” (NCTM, 1989, p. 1) and to command the conversation of mathematics education reform. With nowhere to turn for funding, NCTM solidified its credibility by sponsoring the Standards internally.  

Francis (Skip) Fennell, president of NCTM from 2006–2008 and member of the Principles and Standards (PSSM) writing group, touts internal funding as the thing that sets the Standards effort apart from efforts in other disciplines:

> It’s not coincidental that pretty much every other professional society that represents teachers, whether that be the National Council of Social Studies or the National Science Teachers Association, soon followed with their own set of standards, so clearly NCTM led the way. I think what’s also unique about the NCTM contribution, in addition to it being early and really pushing the profession both within our field and outside of our field, was that NCTM did this by themselves. This was not funded by the National Science Foundation, the United States Department of Education, or any other external funding element. NCTM decided that it was time to do that.

In this quote, Skip Fennell reveals two aspects of the Standards that have become boasting points for the NCTM. It is important to note, however, that the NCTM did secure some external funding for the CESSM. John Dossey explained:

> We had some little bits of funding from the AT&T Foundation which, we laughed, got spent four or five times over. We had this funding and basically the executive committee of the Board could make a decision to allocate these funds. We would allocate them, get some things started, and then we would go back to the Board and ask the Board to allocate

---

51 In the Bold Ventures study, McLeod and colleagues (1996) give an exception to the argument that the Standards were funded entirely by NCTM. Seeing the impact of the CESSM (described in the following chapter), NSF showed interest in funding NCTM’s proposals for developing other documents. NCTM and NSF reached an agreement to divide the budgeted cost for the PSTM (NCTM, 1991). “The proposal budget for the initial development of the Teaching Standards was about $350,000, and about half of that amount was received from NSF” (McLeod et al., 1996, p. 74).
NCTM funds to do it, thus moving the AT&T funds back into the budget to serve as the start-up money for the next thing. That needed to be done between Board meetings. Other than the AT&T funds, which were less than $100,000, the entire effort was funded by NCTM; there were no National Science Foundation grants, there were no large private foundation grants, et cetera…We did seek some funding initially from the McArthur Foundation\textsuperscript{52} and the Honda Foundation. We did not receive that funding from either one. We could have re-done our proposal that went to the McArthur Foundation and I think we would have received funding, but they wanted us to go in a different direction than what NCTM’s leadership had suggested, so we went it alone. We thought also that the \textit{Standards} would be better accepted in the field if they came from the NCTM rather than the NCTM as funded by someone else.

In addition to highlighting the credibility that not securing external funding secured for the \textit{Standards} process, the \textit{Standards} represented the first effort in which a professional organization or group representing content teachers took a position to shape that content area (Addington, Clemens, Howe, \& Saul, 2000; Crosswhite, Dossey, \& Frye, 1989; Ferrini-Mundy, 2000).

\textbf{Summary and Conclusion}

In this chapter, I have discussed the historical precursors of the \textit{Standards} movement through some of the major points of curricular tension in 20th century education in the United States. The debates between progressivism and traditional mathematics and between mathematicians and mathematics educators motivated the formation of the NCTM, an organization which, since its founding, has shifted its standing from a teacher group to a more active political organization by making strides to increase the presence of mathematics educators in debates about K–12 mathematics curriculum, teaching, and learning.

\textsuperscript{52} McLeod and colleagues (1996) write that the MacArthur Foundation did offer $85,000 in support of further work related to the \textit{Standards} after the \textit{CESSM} was published.
NCTM’s first significant move to place the discourse of K–12 mathematics education in the hands of mathematics educators was *An Agenda for Action*. The conditions surrounding the writing and publication of this brief set of recommendations, including, but not limited to the strategic release of the PRISM report, revealed how NCTM began to leverage its position as the leading national organization for mathematics educators, a process that continued throughout the *Standards* movement. In the following chapter, I continue this narrative, examining the process of writing and disseminating the *Standards*. 
CHAPTER 5
THE STANDARDS DOCUMENTS

In the previous chapter, I discussed the two precursors to the Standards published by NCTM: the PRISM (NCTM, 1981) report and An Agenda for Action (NCTM, 1980). The release of these two documents, combined with the other events discussed, marked the beginning of the Standards movement as NCTM continued to strategize how it could affect the direction of mathematics education in the United States.

The NCTM’s first attempt to offer curriculum standards for K–12 mathematics was divided into three components: Curriculum and Evaluation Standards for School Mathematics (1989), Professional Standards for Teaching Mathematics (1991), and Assessment Standards for School Mathematics (1995). Skip Fennell referred to these three documents as a “trilogy.” Although they were published separately, most of the writers referred to them as a set where the Curriculum and Evaluation Standards (CESSM) was the primary document and the Professional Standards (PSTM) and Assessment Standards (ASSM) were supplemental. A second attempt came in 2000 with the Principles and Standards for School Mathematics (2000). In this chapter, I examine the processes of planning, writing, and disseminating these documents. I end the chapter with a discussion of the Standards as a discourse.

As a reminder, I use the following abbreviations for the Standards documents: Curriculum and Evaluation Standards for School Mathematics (CESSM), Professional Standards for Teaching Mathematics (PSTM), Assessment Standards for School Mathematics (ASSM), and Principles and Standards for School Mathematics (PSSM). In the interviews, participants often referred to these documents as Curriculum and Evaluation Standards, Teaching Standards, Assessment Standards, and Principles and Standards, respectively. Some also used the year of publication to refer to the documents.
In the last chapter, I briefly discussed NCTM’s leadership structure. With the exception of paid staff positions and elected positions such as the Board of Directors and president, NCTM runs through voluntary committee service based upon presidential appointments (Lindquist, 2003; McLeod et al., 1996). In his interview with McLeod and colleagues, John Dossey reported that the final push to create the Standards came from within the committee structure.

The Research Advisory Committee (RAC) received a request from one of the affiliated groups to censure the Saxon books on the basis of an article that was published in the Phi Delta Kappan (Saxon, 1982). RAC members felt that it was inappropriate for professional groups to censure material, especially in the absence of an agreed-upon set of standards. Rather, professional groups should take the leadership in promulgating the beliefs of the profession. We took that idea back to the NCTM Board in the spring of 1983. (McLeod et al., 1996, p. 31)

In my interview with him, John Dossey recalled:

There were calls for NCTM to censure [the Saxon] curriculum that were coming from people who were as far to the other end with problem solving as that curriculum is to algorithms. Basically it was my position and Joe Crosswhite’s [NCTM president, 1984–1986] position that we couldn’t censure something unless we said what the standards were that materials should be measured against. We didn’t feel that it was NCTM’s job to be a final arbiter of ranking curricula. Rather it should be an organization, not unlike other professions, that sets standards and holds the standards up as kind of beacons by which individual people or states could make judgments….That [idea], what does the profession feel, was the natural step forward from the Agenda for Action into doing the Standards.

While the Research Advisory Committee stated the need for standards based upon the desire for evaluative criteria, the Instructional Issues Advisory Committee created the plan for the document (McLeod et al., 1996). According to the committee’s proposed plan, the document would include standards for curriculum, instruction, and evaluation. The Board of Directors later decided to include curriculum and evaluation standards in one document, and instruction standards in a later one. “The decision to start with a
focus on content (and consequently evaluation) was based in part on the fact that most people in mathematics education find it somewhat easier to discuss content than pedagogy” (McLeod et al., 1996, p. 43). The choice to separate curriculum from teaching was not easy as one reason for the failure of previous reform efforts such as New Math and Back to Basics was the lack of focus on comprehensive change that addressed both curriculum and teaching. In order to provide a more comprehensive picture than previous efforts had, NCTM published three documents to address curriculum (CESSM), teaching (PSTM), and assessment (ASSM).

There is some discrepancy among the interviews and documents regarding whether these first three documents were planned from the beginning or if plans for the PSTM and ASSM came after work on the CESSM had begun. Gates (2003) says that growing interest in assessment after the CESSM and PSTM motivated the ASSM. The Bold Ventures study suggests that the CESSM and PSTM were planned from the beginning, with plans for the ASSM coming later (McLeod et al., 1996). Diane Briars, a member of the CESSM and ASTM writing committees, did not have the impression that there would be assessment standards during the writing of the CESSM.

I don’t remember there being any sense that there was gonna be something. There was talk then when we were working on the curriculum standards that there would be something around instructional standards and teaching. I think as we were writing and thinking we were supposed to be talking about the “What” not so much the “How” but I don’t think there was any thought about assessment standards. I think that that idea came later because I was actually on a task force that met to think about whether we should do assessment standards and if we did what they should look like.

Skip Fennell implies that the release of the three documents in the “trilogy” was planned as a timed release:
The Professional Standards came out two years after the Curriculum and Evaluation Standards in 1991 and they were used pretty heavily to support, in the name of professional development, what had come out of the 1989 Curriculum and Evaluation Standards. I actually was on the NCTM Board of Directors when the Assessment Standards came out. They were delayed a bit….I think the original plan was for the Assessment Standards to come out in 1993.

John Dossey affirmed Skip Fennell’s “trilogy” reference and explained that, although original plans dictated a document that encompassed curriculum, teaching, and assessment, the decision to separate them was made from both a fiduciary and policy perspective:

They actually were planned pretty much from the get-go. In fact, our first draft of the policy document at the NCTM Board level actually had content, assessment, and teacher education in it but as we moved forward and we talked with people at the National Science Foundation, the Conference Board of the Math Sciences, and a few private foundations it became clear that we should cut it down to something smaller and more focused both from a cost basis and from a policy statement of building support for standards and then moving it to assessment and then to teacher education, so it was a planned study from the get-go….I think a trilogy is a good way of thinking about it. I think it also had the benefit that people got in mind what the framework was for content and were able to separate content knowledge standards from the more process-oriented standards that were in the first document and to really see them as being almost crossed as the abscissa and the ordinate of a framework for looking at the entire content portion of what’s taught. What the expected outcomes related to the mathematics are and having that as a basis for how to assess it, which came next, and then how to prepare people to adequately provide the instruction and develop teacher education programs. That came in the third document.54

Although the agenda for publishing this documents remains unclear, it is clear that the NCTM leadership planned for the Standards project to be a large and lasting endeavor (McLeod et al., 1996).

54 The chronology in Dossey’s statement is incorrect. The teaching Standards (PSTM) were published before the assessment Standards (ASSM).
The NCTM Board of Directors sanctioned each document before the writing process began and before its release. “Whenever something like that comes out the Board of Directors has to approve it before its release” (Skip Fennell). For each document, the president of NCTM was responsible for appointing the writing committees including a chair to oversee each project.

*Curriculum and Evaluation Standards for School Mathematics (CESSM)*

The *CESSM* writing process began in 1986 when the Board of Directors assembled The NCTM Commission on *Standards* for School Mathematics as a “steering committee” (John Dossey) led by Thomas Romberg, chair of the *CESSM* writing committee (see Appendix F for a list of members).

There was a steering committee for the *Standards* chaired by Tom Romberg. Then there were the writing team leaders. In other words, Paul Trafton (leader for K–5), Glenda Lappan (leader for 5–8), Chris Hirsch (leader for 9–12), and Norman Webb (leader for the evaluation group). Then there were past (F. Joe Crosswhite), present (John Dossey), and future (Shirley Frye) Presidents of the NCTM. The committee was rounded out by Lynn Steen (President of the Mathematical Association of America), Shirley Hill (who was President of NCTM at the time of the development of the *Agenda for Action* and current Chair of the Mathematical Sciences Education Board at the National Research Council), and Dale Seymour (CEO of Dale Seymour Publications represented the publishing community). (John Dossey)

Glenda Lappan discussed her conversation with Romberg when he approached her about being a part of the Commission:

Tom Romberg and NCTM were interested in doing something that would be helpful to the nation. He sort of walked me out the door, talked to me, and asked me if I thought the time had come that we should actually write some documents that would help the school community across the nation get together on a set of ideas that could raise the standards for what was happening for kids and I agreed with him. I said, “I think that’s a wonderful idea. Why don’t we talk about this, get some people together, and see if there’s any excitement about this?” Of course there was, so we had our own get-together and we decided “Yes. We will go forth and do
this.” So we put together teams for each of the grade levels: for the elementary, for the middle school, and for the high school. NCTM was behind this 100%.

The Commission’s position was to act as a liaison between the Board and the writers because “there was some concern among the leaders that individual members of the Board might try to influence the writers directly, possibly trying to advance their own personal agendas” (McLeod et al., 1996, pp. 45–46). Given this concern, it is interesting to note that two members of the CESSM writing group did serve on the Board during the writing and publication process: Mary Lindquist (1985–1988) and Cathy Seeley (1988–1991).

In addition to selecting and organizing the writing groups, the Commission’s responsibilities included

[advising] the team leaders and [discussing] where the standards would go and what kind of framework might the standards be, but clearly they should be a statement of what students should know or be able to do and written kind of broadly, not down to specific grade levels in this initial standards document. (John Dossey)

The Commission was also responsible for reviewing drafts from the writing group and providing feedback. Lynn Steen summarized the Commission’s responsibilities:

The various drafts from the writing committees were assembled under Tom Romberg’s leadership and reviewed by the Commission (of which I was a member) every four months or so. Our comments were sent back to the writing groups. At the end, we walked through the entire document, page by page, letting every member of the Commission raise questions and discuss ways to resolve issues.

The Commission chose to divide the document into six sections: (a) Introduction, (b) Curriculum Standards for Grades K–4, (c) Curriculum Standards for Grades 5–8, (d) Curriculum Standards for Grades 9–12, (e) Evaluation Standards, and (f) Next Steps. The standards sections contain a total of 54 standards. There were working groups
assigned to each of the grade band curriculum standards sections and the evaluation standards (See Appendix F for the full list of participants in the CESSM).

Selecting the Writers

The Commission on Standards for School Mathematics constructed each of the working group with great intention. “Each [member of the Working Groups represented] a cross section of mathematics educators, including classroom teachers, supervisors, educational researchers, teacher educators and university mathematicians” (NCTM, 1989 p. v). Glenda Lappan described the criteria that they used to select writers for both the CESSM and the PSSM.

The criteria that we had in our heads was we were trying to bring people in who had experiences as some form of leader in their school people who would have not just their own perspective but would have a slightly broader perspective on what was happening in schools. So we very carefully chose people that would represent different kinds of schools. We wanted to be sure that we had people coming from different parts of the country, so we thought about those kinds of things….There was an elementary teacher that served one of the groups. We had a middle school teacher on our middle school writing group….What we were after was making certain that we created within each of the writing groups a community that would have everything it needed to get this thing right and it had to have a teacher.

According to John Dossey:

I worked to create a coherent working group of a leader and five additional people that would be reflective of teachers at that grade level; someone who knew technology, someone who knew curriculum well at that level, someone who was a state supervisor, and some classroom teachers as well as a teacher educator. We had to fudge people’s categories a little and sometimes people would fill two of those roles and we would have two of another type like two classroom teachers. Then we would make sure that there was someone in each of those writing groups that carried what I would call the union card of pure math; not necessarily a PhD in pure math but someone who was recognized as very knowledgeable about mathematics by the mathematics community. Then these names went forward first to the NCTM Executive Board and Tom
Romberg, then to the working group leaders, and finally to the NCTM Board itself for approval.

Cathy Seeley commented that, “the representativeness of the groups was really interesting that way because you had lots of different voices that you could hear within the teams and then across the whole group.”

In the introduction to the CESSM quoted in the previous paragraph, NCTM did not define “mathematician” as criteria for participation, but it seems that mathematicians were considered to be those mathematics educators who worked in mathematics departments rather than colleges of education. According to Olson and Berk (2001):

> The 1989 document reflected primarily the views and perspectives of professional mathematics educators—teachers, teacher educators, supervisors, and mathematics education researchers. Indeed, although many of its writers had extensive backgrounds in mathematics and were faculty members in mathematics departments in major universities, the 1989 Writing Group did not include members whose primary professional activity was the production of new research in mathematics. (p. 305)

Schoenfeld (2004) attributes that this lack of participation from mathematicians to their limited perception of the effort: “Various mathematicians invited by Dossey to participate in the writing effort declined; from their perspective, this was an in-house affair for NCTM and not necessarily worth the effort from outsiders” (p. 266). Roitman (2000) also indicates a sentiment among mathematicians that the CESSM was insignificant: “Who could have predicted that the 1989 Standards would matter? But it did” (p. 5).

The role and type of mathematicians working on the Standards changed in the PSSM. I address this change later.

**The Writing Process**

The writers met for the first time for an orientation during the 1987 NCTM annual meeting in Anaheim, California. In the summer of 1987, the writing group convened in
Park City, Utah for two weeks\(^{55}\) and in Leesburg, Virginia\(^{56}\) later in the summer for another two weeks. Glenda Lappan described the location:

> We carried all of our working groups off to a mountaintop in Utah. At that time Park City, Utah was not developed at all. It was an amazing location because in order to get a Coke somebody had to go down to a store that was at the bottom of the mountain, but relative to our work it was perfect. There were no distractions. Each of the working groups had a house.

The writing began with a whole-group meeting in which the leadership shared the two tasks with which the NCTM Board of Directors charged the CESSM Working Group:

1. Create a coherent vision of what it means to be mathematically literate both in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied in diverse fields.
2. Create a set of standards to guide the revision of the school mathematics curriculum and its associated evaluation toward this vision. (NCTM, 1989, p. 1)

Armed with this charge, the writers “set out to organize [their] groups and get started” (Gerald Rising).

Neither the NCTM Board nor the Commission on Standards for School Mathematics provided much direction for the writing process beyond the initial charge. This lack of intervention later presented a challenge many members of the Working Group were not strong writers (McLeod, 2003; McLeod et al., 1996). The narrators remember this lack of direct oversight as both a blessing and a curse.

> It was pretty open about what we could do. We all had enough experience….No, we weren’t constrained. I didn’t view us as constrained but we all knew that you don’t implement change without referencing it to

\(^{55}\) The Utah Council of Teachers of Mathematics hosted the writing group according to a statement of thanks recorded in the CESSM (p. v).

\(^{56}\) This meeting was held at the Xerox corporate training facility.
what teachers are used to doing. We were all painfully aware of the “New Math” phenomenon because we all experienced it one way or another. We either taught it—admittedly I’m one of the people that taught it—but some of the people actually learned it as a student. So we were painfully aware that there has to be some careful thought about not going too far out on a string in what kind of curricular change we wanted to implement. So we set out with a pretty free hand....Our chair who was Chris Hirsch did a magnificent job of putting our thoughts, notes, and outlines—our stuff—together in a document. Of course we had a lot of interaction but he worked much harder and longer than we did and took his job very seriously. (Bert Waits)

I think we were given carte blanche. In fact that was one of the problems. We were sort of, as you say, in undiscovered territory. This was not something that had been done. I don’t think we had the sense that appeared after the document was published that we were the first to develop this kind of thing but that clearly was one of the outcomes. (Gerald Rising)

I think Tom Romberg took a stand that they didn’t want to be heavy handed. I think they turned us loose so I would say, in my judgment, we were not at all strongly guided. There were certain principles that we knew, as you mentioned, about earlier recommendations of the NCTM and Agenda for Action and so on. I think that they selected people who would resonate with what NCTM had done. I think that was about it. I didn’t feel at all as if there was any suppression of ideas. It was wide open. (James Schultz)

McLeod and colleagues (1996) echoed Schultz’s observation that Romberg was not willing to assert too much influence in the writing process and presented this stance (or lack thereof) as a point of contention in the writing process.

Romberg would rarely take a stand on an issue, preferring to let the groups fight it out, though there were times when people “very much wanted him to take a stand.” The chairs of the writing groups were often caught in the middle, and the pressures were intense. (p. 49)

It is possible that the tension was due not only to the lack of intervention, but also to the perception that the possibilities for the CESSM were not actually limitless. Tom

---

57 I exercise great caution in my writing here because I do not want to represent Thomas Romberg as passive or indecisive in any way. Unfortunately, I was not able to interview him for this study to ask about the rationale for his stance.
Kieren told McLeod and colleagues (1996) that “One of the things that struck me was that we were not to be making suggestions that seemed very radical. This really struck me at the first meeting—the narrowness of the task” (p. 49). In his subsequent writing, Romberg (1998) revealed that he was not sure how to turn the rhetoric of reform from *An Agenda for Action* into reality:

I must admit, however, that when the *Curriculum and Evaluation Standards for School Mathematics* was prepared, we did not have a clear image of what it was we wanted as an alternative or how reform could be achieved. Rhetoric about the importance of solving problems or about the need for students to make conjectures and build arguments, or about doing something other than hours of routine calculation with little understanding does not make such changes actually happen. In fact, we did not have examples of what the implementation of such slogans would actually mean in U.S. classrooms, or how long it would take. But admitting our lack of clarity does not mean we had no hunches or conjectures about what might be done….What we hoped would happen was that teacher, developers, researchers, and others would take the NCTM ideas in the documents as a starting point for a reform movement involving creative development and trials of new materials and methods of instruction. (p. 13)

The working groups took what they understood of NCTM’s goals for the document and developed the document in meetings both as separate grade bands and as a whole group. The leaders met daily to review the coherence of the document as it formed and to provide constant feedback.

Those of us that were the leaders met every night to look across the conversation to see whether or not we were coming up with a set of ideas that had a developmental flow in them through the elementary in to the middle, through the middle into the high school. So leaders of the groups worked very, very closely and virtually around the clock. There were nights that I didn’t feel like I slept at all. (Glenda Lappan)

In addition to daily feedback from the leaders, James Schultz recalled that Daniel Dolan (another member of the 5–7 Working Group) sought feedback from teachers during the writing process:
As we were writing he was typing things back to a group of teachers in Montana and we would get feedback the next day. We’d write something and he would send it to teachers in Montana and they would comment on it and he would come back the next day and say “I ran this by some teachers” and he would give us input from back in Montana, what people were thinking of what we were writing. From classroom teachers.

At the end of the first summer, a working draft of the CESSM was released for comment and received an “overwhelmingly positive response” (NCTM, 1989, p. 251). The comment process included discussion groups at state, regional, and national NCTM meetings and circulating the draft widely.

That early draft was circulated to NCTM leaders and math ed national leaders and the steering committee [The Commission on Standards for School Mathematics]. They all gave written responses back….That draft document served as the basis for several sessions at each of the regional meetings of NCTM as well as state meetings that year. NCTM actually funded a couple of focus group meetings to get input from the field. (John Dossey).

We put together a draft of the document and we took the draft of the document on the road. We wanted input. We did not want to go off as a group by ourselves and try to speak for the Council. We wanted teachers across the nation to have their input. So I essentially was on the road for every single solitary NCTM conference (small medium, whatever) throughout that year after the summer in which we wrote the first draft. It was a collecting [of] ideas. (Glenda Lappan)

A group of graduate students cataloged all of the feedback and prepared it for the writing group when they reconvened in Park City in the summer of 1988 to make appropriate revisions.

My recollection is that there were 80,000 pieces of feedback from between the summer of ’87 and the summer of ’88 that was organized by these grad students ahead of time into categories of stuff by grade level, by categories of the type of feedback, and so on. And they came from individuals. They came from groups. They came from faculties. They came from all different kinds of people. That, to me, is unprecedented to have that kind of involvement. (Cathy Seeley)
Disseminating the *CESSM*

After the second summer of work, the writing group leaders continued to revise the document in preparation for publication and dissemination in March of 1989. As with the other events of the *Standards* movement, this release was planned well. In January of the same year, the Mathematical Sciences Education Board\(^58\) of the National Research Council, chaired by Commission member and former NCTM president Shirley Hill,\(^59\) released *Everybody Counts: A Report to the Nation on the Future of Mathematics Education* (National Research Council, 1989). In his interview, John Dossey described the formation of the Mathematical Sciences Education Board and the release of *Everybody Counts*:

That actual release [of the *CESSM*] was structured because, at the same time, NCTM leaders, along with MAA leaders, worked with the National Academy of Science to start the Mathematical Sciences Education Board at the National Academy of Science. In January of 1989, *Everybody Counts* came out. That was a planned precursor document saying what the nation needed and defining the issues that called for a standards document. That set the stage for the standards document to be the answer.

*Everybody Counts* proposed an equity agenda for mathematics education, so this coordinated release was planned in support of *CESSM*’s nonelitist “mathematics for all”\(^60\) stance (Apple, 1992; Schoenfeld, 2004).

---

\(^58\) The purpose of the Mathematical Sciences Education Board was “to provide national leadership and guidance on issues affecting the quality of instruction in the mathematical science at all levels” (McLeod et al., 1996, p. 68).

\(^59\) In addition to Shirley Hill, Iris Carl, John Dossey, Shirley Frye, Thomas Romberg, and Lynn Steen were members of both the NCTM Commission on Standards for School mathematics and the Mathematical Sciences Education Board in 1989.

\(^60\) Hirsch and Coxford (1997) define “mathematics for all” as “a commitment to the belief that all students can learn mathematics and to the objective that all students must learn more, and different, mathematics than in the past” (p. 232). I discuss “mathematics for
The CESSM’s actual release was equally calculated. Using funds secured, in part, from the Exxon Education Foundation, NCTM wanted to secure a strong media presence to discuss the release. The organization hired the public relations firms Burson-Marsteller and Gallagher-Widmeyer to manage the dissemination effort (McLeod et al., 1996). Cathy Seeley recalled being part of a group of leaders trained as ambassadors for the CESSM,

So I’m in this unique role because I’ve been on the [writing] committee. I’ve just been elected to the NCTM Board, and I’m a pretty good speaker. So in 1989…NCTM identified a cadre of people…I think Diane [Briars] was on that list61 ….There were probably four or five of us, maybe a couple more.

Shirley Frye, NCTM president at the time of the CESSM release, recalled:

NCTM leaders spent entire days with the firm learning how to deal with radio and TV reporters, how to answer questions without being defensive, and how to get the message across to the audience. We saw videos of people who had been effective and some who had not, and even watched our own interviews. (McLeod et al., 1996, p. 64)

The firms prepared NCTM leaders to handle the press during and beyond the press conference for the release of the CESSM on March 21, 1989 in Washington, DC. They also helped to ensure that NCTM’s message was consistent. The NCTM presidential unit—John Dossey as immediate past-president and Shirley Frye as president—was the face of NCTM in the press. John Dossey recalled some of the other media activities:

They made contact with the Today Show so the day the standards were released I was on the Today Show talking about it in the morning. In the weeks previous to that I met with the editorial committees of the Los Angeles Times, the Chicago Tribune, the New York Times [(Daniels, “all” and equity at other points in this study, but the social agenda in the Standards movement is a subtext to this study that I plan to pursue at another time.

61 In our interview, Diane Briars did say that she traveled to talk about the discussion draft of the CESSM, but did not mention traveling in support of the final version.
NCTM also released a video featuring celebrities such as jazz musician Wynton Marsalis that was shown on 121 U.S. television stations.

Following the media release, NCTM took the message of the CESSM on the road.

In 1990, Iris Carl became NCTM president and a representative from Gallagher-Widmeyer traveled with her to arrange media events to coincide with smaller NCTM events.

Residents of Iowa, New Mexico, Oregon, and other states would find the NCTM president on their local television news, frequently appearing along with the best of the region’s mathematics teachers and footage of local classrooms where the influence of the NCTM Standards seemed notable. (McLeod et al., 1996, pp. 64–65)

Each NCTM member received a free copy of the CESSM; this gesture placed the document in the hands of a large portion of the mathematics education community. The Standards Coordinating Committee also prepared an executive summary to target those outside of mathematics education. Judith Sowder, the chair of the NCTM Standards Coordinating Committee, described dissemination in the Bold Ventures study:

The mailing lists were enormous. The NCTM lobbyist took them around personally and handed them to members of Congress. Certainly every dean of science, every chair of a mathematics department, every math coordinator, high school principal, and elementary school principal who was on our mailing lists got one. We sent to PTA presidents, school board presented, and on and on and on. Every mailing list that could possibly be used was used….Many people wanted copies [of the executive summary] to pass out to the school board, and those who were giving a presentation on the Standards to parents or others wanted copies, too. We asked NCTM to make copies available in bulk at cost, and that has been very successful. (McLeod et al., 1996, pp. 63)
Tone of the CESSM

For Klein (2007), the CESSM was a document that “reinforced themes of progressive education by advocating student-centered, discovery learning” with a “strong utilitarian justification” (p. 23). Following the direction of An Agenda for Action, CESSM gave great attention to problem solving. The writers also addressed the place of technology in school mathematics. James Schultz credited Bert Waits for the “very aggressive stand on the use of technology especially in high school with the graphing calculator,” but notes some misunderstanding when “some people thought that we were saying that technology could do everything so kids didn’t have to know basic facts and things like that.” Along with the focus on student-centered learning and technology integration came an avoidance of issues that were more politically charged such as tracking (McLeod et al., 1996). Equity in general received very light treatment in the CESSM.

An NCTM leader confirmed that there was concern that a heavier focus on equity might detract from what would already be a controversial document. Nevertheless, most writers felt they had addressed equity in a significant way, especially in their call for a strong core of mathematics for all students. In their view, the recommendation for a core curriculum that “provides equal access and opportunity to all students” (NCTM, 1989, p. 130) was a strong statement with significant implications for equity in mathematics education. (McLeod et al., 1996, p. 56)

Later, NCTM attempted to rectify the failure to address equity in the CESSM by making it a core principle in the PSSM.

Critique of the CESSM

The CESSM was generally well received, but, given the multiple audiences, it was impossible to please everyone. In a column in Educational Leadership, Willoughby
(1998) wrote: “A document of this size and scope must either be bland, useless or include something to irritate every reader….Reviewers are expected to find something with which to quibble” (p. 82). Skip Fennell described a five-year honeymoon period for the CESSM. “By that I mean they were widely accepted by the community in mathematics education and they were widely accepted by policymakers within the field of education.” These first five years saw the publication of the PSTM and the beginning of the writing process for the ASSM. In addition, the NSF showed its support for the Standards effort by funding the development of curricula that aligned with the CESSM.

Despite the positive reception, the CESSM also met some strong criticism. Each participant that I interviewed relayed her or his sense of the seriousness of the work on the CESSM and was proud of the product, although they were each critical of certain elements. They described the writing as intense, yet fulfilling. In my opinion, they had and maintain a deep sense of ownership of the work. This connection made it difficult to stomach criticism from the outside.

“I as well as some of the others do not take suggestions or criticism easily,” noted one writer. A leader said that a critic was welcome to come to the group meeting but reminded the critic to mention “what was good was well as what could be changed” and to “be sure to bring an example of what the change could be” (Log 1, p. 15)….The pressures were intense and the importance of the task was deeply felt; several writers were reduced to teas by criticism of their work. (McLeod et al., 1996, p. 52)

The research community. Carnine and Gersten (2000) described the CESSM as one of many examples of the “implementation of a set of practices before any experimental evaluation…a practice that has run rampant within the educational community” (p. 140). It was known that the changes proposed in the CESSM were based on theory rather than empirical research. When the first draft of the CESSM was released
in October 1987, John Dossey, as NCTM president, asked the Research Advisory Committee (RAC) of the NCTM “to consider the document and discuss ways in which the committee could act or make suggestions to assist in implementing the Standards” (Research Advisory Committee of the NCTM, 1988, p. 338). The RAC made specific recommendations to the Board of Directors but did not disclose those recommendations in its publication. Nevertheless, it is clear that the RAC did not intend to critique the CESSM, but rather to address two key questions “What is the research base for the recommendations made in the Standards? What agenda for new research is implied by the Standards?” (Research Advisory Committee of the NCTM, 1988, p. 338).

The insufficient research base for the CESSM in both its draft and final forms was a consistent critique from several groups including the RAC. The RAC wrote:

The Standards document contains many recommendations, but in general it does not provide a research context for the recommendations, even when such a context is available. Practitioners who advocate adoption and implementation of the Standards in their local situations will need to have the research base clarified, since such information will be vital in their efforts to convince administrators and other policy makers that the recommendations are worthwhile. (Research Advisory Committee of the NCTM, 1988, p. 339)

The RAC’s conclusion from its own inquest and a session at the 1988 NCTM Research Presession cosponsored with the American Educational Research Association’s Special Interest Group for Research in Mathematics Education was that the research base for the CESSM did exist but was unarticulated. The two groups asserted that the CESSM offered

---

62 Throughout this study, I have noted when members of the Standards writing committees have been involved in other aspects of the process through other NCTM committees or other organizations. To be consistent, I note here that none of the members of the RAC in 1988 were part of the CESSM writing committee.
a new vision of school mathematics that warranted a “transformative research agenda”

(Research Advisory Committee of the NCTM, 1988, p. 341).

**The Math Wars.** During the interviews for this study, an interesting story surfaced about these final revisions. In each section of the CESSM, there appears a table indicating topics that should receive more and less attention. Angela Andrews (a member of the PSSM writing group) shared a story told to her by Paul Trafton (a member of the Commission for Standards for School Mathematics):

They [the CESSM] were very historic but Paul told me “You know Angela, we worked on those things for three years just like you guys” and he said the last day of the third year, the day they were going to press, we went out to lunch and over a few drinks someone said, “You know what’s missing out of the ’89 standards?” and they said “No. What?” and they said, “We need a one-page synopsis of what we’ve done here. Let’s just think.” They started brainstorming it. “Now here’s how I would do it. I would say we’re gonna emphasize this and we’re gonna deemphasize that” and they started brainstorming over lunch... You know somewhere in the...1989 [document] there is something that says that the Standards call for an emphasis on this and a de-emphasis on this. That lunch over drinks where they thought that was a great idea to put in there and they put it in there according to Paul Trafton and I really believe it. It was the shot heard around the world in the Math Wars. It shouldn’t have been put in there. They should have thought it out more carefully because they did not think how it would be interpreted. Every single thing on that page was good but it needed an explanation. They had been working with it for three years. The minute it said de-emphasis on math facts, that’s the first volley.

Alan Schoenfeld also mentioned this story:

Tom Romberg told me that there’s one chart that caused more trouble than anything else in the 89 standards. That was the chart that said, “These

---

63 The Math Wars represent the complexity of relations between mathematicians and mathematics educators as it relates to mathematics education reform. I could devote an entire study to them. Here and in Chapter 6, I discuss the Math Wars in light of the NCTM Standards, but I recognize that they are much more complex than what I have greatly (and perhaps grossly) reduced to present here. Additionally, for the most part, the narrators in this study represent one “side” of the Math Wars debate; a fair historical treatment of the Math Wars would require narration from other perspectives.
things should receive more emphasis. These things should receive less emphasis.” What happened was two-column proofs was in the less-emphasis column and that was one of the things that enflamed the math wars because some mathematicians said, “Look, they’re throwing proofs out.” Tom told me that they made the decision to put that table in something like a week before NCTM produced the original standards. They had no idea it would turn out to be controversial.

When asked about the tables, John Dossey responded:

The tables did assist in starting conversations about the major changes in levels. Some reductionists tried to use the contrasts as a concrete model of the standards as not refer to other contents of the document that dealt with process. This led to some polarization. On the other hand, correctly used, these tables helped start conversations about change that led to broader and more productive conversations.

It is possible to debate the whether these tables add to or detract from the message of the CESSM, but it is apparent that the table presents a rhetorical challenge. When those who create curricula see that certain elements should receive “decreased attention,” how should they respond? Judith Roitman (1998), a mathematician who participated on the PSSM writing committee, addressed this rhetorical challenge. She wrote:

I have no quarrel with anything that is supposed to receive increased attention. The suggested curriculum is good, authentic mathematics, and the instructional practices are clearly pointed toward making mathematical sense of things. Despite claims that standards-based reform means a lowering of standards, if everything that is supposed to receive increased attention really does, our current students will in many ways know much more mathematics by the time they graduate from high school than my generation did. My quarrel is, instead, with the pages labeled “Decreased attention.” The deck is rhetorically stacked, so that “decreased” can easily become “no.” Bad words appear, such as *rote, isolated, routine, by type*—everyone knows these are bad words—and by association everything on these pages becomes suspect. (p. 34)

---

64 During our interview, Judith Roitman said that she was compensated for writing this article. A statement at the end of the article says: “This article was commissioned by the National Institute for Science Education in the spring of 1996, as a mathematician’s reaction—qua mathematician—to the National Council of Teacher’s [sic] of Mathematics Standards” (Roitman, 1998, p. 42).
Roitman continued to argue that the mere fact that something is taught by rote method does not make that idea bad; it is not black or white. “So as long as there is no distinction between what should really be thrown out and what has to be taught differently,” she wrote, “important school mathematics will be in danger of disappearing from school curricula” (p. 36).

Not all mathematicians were as gracious as Roitman in their response to these tables or to the CESSM in general. In the late 1990s, a group of mathematicians, mathematics educators, parents, and others concerned with mathematics education reform as presented in the Standards created an informal organization and website called Mathematically Correct65 aimed at not only critiquing the Standards movement, but also openly acting against NCTM and its reform efforts. Haimo (1998) summarized the disagreement that those who aligned with Mathematically Correct had with the Standards:

Troubling to this group is the fact that these standards fall short of providing a reasonable balance. They highlight the applications of everyday experiences. On the other hand, they fail to emphasize adequately the theoretical aspects that make mathematics a unique and important discipline. In addition, they do not give enough attention to the development of sound basic skills. (p. 46)

As an indicator of the group’s sentiments, Frank Allen (NCTM president, 1962–1964) included the following poem entitled “Indictment of the Theoreticians” in his critique of the Standards posted on the Mathematically Correct website (Allen, n.d.):

Pity the NCTM today
A worthy group that’s gone astray
A group completely under the sway
Of theoreticians, far away
From schoolroom events of everyday

65 http://www.mathematicallycorrect.com
It matters little what they say
This is the message their deeds convey:
Standardized tests are an awful bane,
They reveal little or negative gain,
And we regard them with disdain.
A little logic might cause some pain,
From proof that’s tough we will abstain.
We’ll appeal to the hand instead of the brain.
Subject teacher time to a terrible drain,
With an assessment system that’s hard to explain.
We’ll repeat sixth grade, like an old refrain,
Recycling the facts all over again.”
“If you disagree with us at all
You are a Neanderthal.”
If we can’t stop them then let us pray
For secondary math in the USA.

Mathematically Correct and those who position themselves accordingly, were consistent thorns in the flesh of NCTM and mathematics educators who aligned themselves with the NCTM Standards. This conflict was based upon many mathematicians’ perception that NCTM was endorsing “fuzzy math” in place of rigor. In her interview, Judith Roitman based the conflict in a lack of understanding:

The ’89 standards were not understood. They were distorted by both sides. There was one group that felt like they were an example of fuzzy thinking and there was another group that felt like they didn’t go far enough….There were people who came down on them because they were not a curriculum so they were being criticized “You didn’t mention this for third grade!” Well, we weren’t supposed to mention that for third grade. So they were just very badly misunderstood. They were general guidelines that were pointing in a certain direction. The list of what to retain and what to give more emphasis and less emphasis to was read as “throw it out altogether.” There were just lots of misunderstandings.

---

66 Several people who have been associated with the site are still very active in their efforts to critique Standards-based mathematics and mathematics educators. Most recently, James Milgram and Wayne Bishop were the subjects of a backlash from mathematics educators in response to their treatment of Jo Boaler, a mathematics educator (see Stinson, 2012 for a brief summary of the situation).
Whether the clash was based upon misunderstanding or not remains unclear. It is clear, however, that the backlash from these mathematicians caused the NCTM leadership to make some changes when planning the *PSSM*. I will discuss some of those changes later.

It is important to note that the reaction of mathematicians to all of the *Standards* activity fell along a continuum that included those who, like Roitman, were amenable to the process, as well as the Mathematically Correct crowd who took a vehement and active stance against the work. Somewhere along that continuum, Bert Waits located his colleagues in the mathematics department at The Ohio State University who disliked the *Standards* but did not take political action.

They were totally dismissively negative. We were the first group to say “Hey there are some old skills that we don’t need to teach any more” and that did not set well with them….They were not a happy bunch. Still aren’t, by the way. Nothing’s changed. They just do not support the NCTM standards….There are some exceptions, but very few of them.

According to James Sandefur, the very vocal opponents were loud, yet few; most mathematicians were not paying attention.

I would say most research mathematicians didn’t pay any attention. You’ve got a small group who liked the document and were supporting it and you had a small very vocal group who were objecting. A lot of their objections were, in my opinion, due to maybe a misunderstanding of the first document. There were a couple of little math errors and they would pick up on it and blow those out of proportion.

**The Writers’ Reactions**

Each oral history narrator who worked on the *CESSM* recounted that she or he did not expect that the document would have the impact that it did. Diane Briars, for example, reflected:

I think what happened was well beyond what the writing group actually expected. I remember Glenda Lappan saying that the end of the writing “Will anyone ever read this?” I think when the *Standards* were written the
goal was that it would influence publishers. It would influence practice. But I think everyone was amazed at the impact it actually had.

In spite of their surprise, the writers were excited about the revitalized national conversation around mathematics education.

The positive reaction from the authors to the CESSM’s popularity was not without reservation. Gerald Rising was concerned that the CESSM would narrow the scope of mathematics education:

I think my reservation was that a group of people came together and made some proposals, but the document was taken as heaven sent. It was taken as though it was prescriptive. I think it was rightly criticized in that form. It was criticized as serving as that kind of a document and, of course, publishers took it as “Oh boy! We can use this!” If you recall at the time—and perhaps you don’t—every publisher started making comments that “our book fits the standards” and that’s continued, I think, for the later standards as though the standards were the end all of everything and that’s what book should be done. My concern then was the standards ended up narrowing the focus and saying “This is it. You should follow this direction.” People who wanted to do different kinds of things had problems. Now I don’t know if I’ve expressed that well enough because I think it’s an important point that of course we ought to be concerned about getting a lot of things across to students while they’re in school and the standards, I think, contributed positively to that. But the negative side of it was what I just said, this narrowing of focus. So there was this positive aspect of them but there was also a serious concern that they narrowed what was to be done and I think that’s continued with the later standards.

James Schultz expressed similar reservations related to the position that the CESSM seemed to take in K–12 education:

It’s like I’m almost, I don’t know if I should say embarrassed, but I’m a little bit troubled by the fact that in some sense you could say our group was largely responsible for initiating the whole standards idea, but I’m making it clear that Romberg, our leader, and as far as I’m concerned most of the team was opposed to the idea of forcing this on anybody, yet that seems to be what I sense went on.
The CESSM created a picture of the mathematics that should be taught in schools and peripherally addressed assessment with the evaluation standards but the NCTM knew that addressing curriculum was only the first step. “The development of the PSTM was stimulated by [a] need to examine teachers’ decision making and judgments about the curriculum, about the classroom, and about the students’ learning” (Lappan, 1997, p. 212). In the larger vision of the Standards as a description of what “a high-quality mathematics education for North American student, K–12, should comprise” (NCTM, 1991, p. 1) the PSTM is “a vision of what teaching should entail to support the changes in curriculum set out in the Curriculum and Evaluation Standards. “ (NCTM, 1991 p. vii).

Immediately after completing the CESSM in 1989, NCTM began work on the PSTM by assembling the Commission on Teaching Standards for School Mathematics.67 The charge for the commission was

to produce a set of standards that promotes a vision of mathematics teaching, evaluating mathematics teaching, the professional development of mathematics teachers, and responsibilities for professional development and support, all of which would contribute to the improvement of mathematics education as envisioned in the Curriculum and Evaluation Standards for School Mathematics. (NCTM, 1991 p. vii)

The commission operated on the assumptions that teachers are central to change in school mathematics and that, in order to effect change, teachers must have “long-term support and adequate resources” (NCTM, 1991, p. 2).

67 In the PSTM, there is a page that lists all people involved in producing the PSTM. On that page, the Commission is called “The NCTM Commission on Teaching Standards for School Mathematics.” Two pages later, in the Preface, the Commission is called the Commission on Professional Teaching Standards.” I assume that both names refer to the same Commission. In my research, I did not find a reason for the name change.
A Different Writing Process

The writing process was quite different from that of the *CESSM* due to reduced meeting time, a different writing process, and a different leadership style. The Working Group for the *PSTM*, led by Glenda Lappan, assembled at Michigan State University in the summer of 1989 (see Appendix G for the full list of participants in the *PSTM*). They met twice for three days; the first meeting was to plan for writing; the second meeting was to critique the draft. This reduced meeting time was a cost-cutting measure implemented because, when the Commission completed its proposal in early 1989, they were unsure how successful the *CESSM* would be and assumed that funding agencies would remain resistant. Glenda Lappan recalled:

> It wasn’t clear what financial resources NCTM could really provide for this second document, because we hadn’t finished the first one before we were actually putting together the makings of the second one. So we were trying to do this as inexpensively as possible. We didn’t go off on mountaintops or anything interesting. (McLeod et al., 1996, p. 74)

The second significant difference between the writing processes for the first two *Standards* documents was a difference in leadership style between Thomas Romberg and Glenda Lappan. Romberg gave the *CESSM* writers carte blanche to craft the document as they saw fit, which allowed for the free flow of ideas but created some discomfort for the writers. Glenda Lappan took a different approach. McLeod and colleagues (1996) quoted an unnamed leader who compared the two: “Romberg and Lappan had different leadership styles—Lappan talked about that in the first meeting. She was not going to be a hands-off leader” (p. 75).

Finally, the actual writing process for the *PSTM* was quite different from that of the *CESSM*, fitting Lappan’s more active leadership style. The Commission on Teaching
Standards for School Mathematics led the effort and the Working Group was divided into three topical subgroups led by a chair and an assistant/reactor: Mathematics Teaching (chair: Deborah Ball; assistant/reactor: Thomas Schroeder), Evaluation of Mathematics Teaching (chair: Thomas Cooney; assistant/reactor: Donald Chambers), and Professional Development of Teachers of Mathematics (chair: Susan Friel; assistant/reactor: Nicholas Branca) (McLeod et al., 1996). According to William Speer, these groups formed as an outgrowth of initial conversations amongst the group:

We did break into working groups because once you start talking about this, there are some natural categories. And of course we fell into exactly what you would’ve perhaps predicted we would fall into. A group worked on the teaching element, a group worked on the evaluation element and a group worked on the professional development side, so we have three working groups that were formed that first summer and those were just brainstorming groups.

As Speer indicated, the groups functioned more for the purpose of brainstorming and writing because the chairs assumed most of the writing duties and the assistant/reactor for each group “had special responsibility for responding to what the leader wrote” (McLeod, 2003, p. 790). Due to the limited time for collaborative work, individual members of the Working Group who did not have a leadership role did not contribute as much to the actual writing. The chairs met in Washington, DC between meetings to complete the writing process.

The two people who helped me to write that document came to DC. We met in my apartment and one of them had a small baby and she brought along a babysitter; the baby and the babysitter. We had a wonderful time.

---

On the page listing the Working Group members for the PSTM (NCTM, 1991, p. iv), only the chair for each subgroup is noted. There is no mention of the assistant/reactor on that page or in the document. McLeod and colleagues (1996) mention this position in the Bold Ventures study; McLeod defines it further in his contribution to Stanic and Kilpatrick’s A History of School Mathematics (McLeod, 2003). In the latter, McLeod refers to the position only as “reactor” (p. 790).
We really did. Deborah Ball was one of those…and the other was Susan Friel from North Carolina. (Glenda Lappan)

Reducing the number of actual writers also resolved the issue of writing quality encountered with the CESSM. As a result of these three significant changes, the camaraderie and sense of ownership built among the CESSM writers did not exist for the PSTM (McLeod, 2003).

Tone of the Document

In the PSTM, NCTM wanted to consider mathematics teaching beyond discussions of teacher education (Ferrini-Mundy & Graham, 2003). In the document, they proposed five “major shifts in the environment of mathematics classrooms” (NCTM, 1991, p. 3) required to create the type of classrooms needed to enact the Standards.

We need to shift—

• toward classrooms as mathematical communities—away from classrooms as simply a collection of individuals;
• toward logic and mathematical evidence as verification—away from the teacher as the sole authority for right answers;
• toward mathematical reasoning—away from merely memorizing procedures;
• toward conjecturing, inventing, and problem solving—away from an emphasis on mechanistic answer-finding;
• toward connecting mathematics, its ideas, and its applications—away from treating mathematics as a body of isolated concepts and procedures. (NCTM, 1991, p. 3)

Each of these shifts juxtaposed a desired aspect of the mathematics classroom with its opposite that represented current practice.

The writers were very concerned about how teachers and their representatives would receive these proposed shifts. They thought that teachers and teachers’ unions might find the term standards to be too prescriptive (McLeod, 2003). The writers site the effort to avoid being prescriptive as a “basic dilemma” in their work: “Professional
standards for mathematics teaching should represent values about what contributed to good practice without prescribing it. Such standards should offer a vision, not a recipe” (NCTM, 1991, p. 20). To avoid this issue, the writers chose to take a different approach to standards by using a series of annotated vignettes “that expressed the spirit of teaching” (McLeod, 2003, p. 791) to “convey images of Standards-based classrooms and they challenges they would present to teachers” (Ferrini-Mundy & Graham, 2003, p. 1270). The vignettes “show[ed] a range of situations in which good mathematics teaching and learning can take place” (NCTM, 1991, p. 5). The writers used the annotations to relate elements of the vignette to a particular standard.

A unique aspect of the PSTM was the focus on discourse, a term that had not yet come into prominence. The Mathematics Teaching Working Group chose to base the first section of the PSTM, Standards for Teaching Mathematics, on the relationship between classroom discourse and mathematical tasks. They defined discourse as follows:

*Discourse* refers to the ways of representing, thinking, talking, and agreeing and disagreeing that teachers and students use to engage in [mathematical] tasks. The discourse embeds fundamental values about knowledge and authority. Its nature is reflected in what makes an answer right and what counts as legitimate mathematical activity, argument, and thinking. Teachers, through the ways in which they orchestrate discourse, convey messages about whose knowledge and ways of thinking and knowing are valued, who is considered able to contribute, and who has status in the group. (NCTM, 1991, p. 20)

Initially, the NCTM leadership was wary of the centrality of discourse in the PSTM due to the leadership’s own lack of familiarity with the concept. Nevertheless, they did agree to proceed with this approach and, subsequently, discourse became a frequent topic in NCTM journals (McLeod, 2003).
Critique for the PSTM

The NCTM’s dissemination plans for the PSTM were similar to, yet smaller than, those made for the CESSM. Each member received a free copy of the document and the Executive Summary went to other interested parties. NCTM state and national meetings focused on the PSTM. Despite these similar efforts, the PSTM did not receive the attention that the CESSM did. A state supervisor told McLeod and colleagues (1996):

I do not believe that there is anywhere near the level of awareness about the Teaching Standards as about the Curriculum and Evaluation Standards. The Teaching Standards have not been as well disseminated, not been as widely discussed, and have not received the attention that they require. We’ve not had as many meetings on them, and they have gotten lost in the shadow of the Curriculum Standards. (p. 79)

State supervisors of mathematics levied a critique toward NCTM because many of them felt that the lack of steam in the dissemination process saddled them with the responsibility of marketing the PSTM in NCTM’s stead.

The most significant critique of the PSTM, however, was its tolerance for ambiguity in the learning of mathematics in a shift in learning theories “from behaviorist psychology to cognitive science to constructivist approaches” (McLeod et al., 1996, p. 112). The writers presented a perspective of student learning that embraced discovery and ingenuity with which many did not agree:

All students engage in a great deal of invention as they learn mathematics; they impose their own interpretation on what is presented to create a theory that makes sense to them. Students do not learn simply a subset of what they have been shown. Instead, they use new information to modify their prior beliefs. As a consequence, each student’s knowledge of mathematics is uniquely personal. (NCTM, 1991, p. 2)

---

69 I discuss some possible reasons for this reduced attention later in this chapter.
Haimo (1998) did not disagree with employing different instructional strategies to teach children mathematics; nonetheless, she argued that the NCTM’s conception of student learning portrays mathematics as a discipline that is falsely social and democratic:

However each student learns, though, the final mathematical result must either agree with the prevailing structure or form the beginning of some extended new theory. If the hypotheses are sound, the conclusion is never in doubt unless it is an unproved conjecture. Ambiguity is foreign to mathematics. Mathematics cannot be forced to be like other disciplines, nor should it be. Despite the current trend to regard mathematics as “social,” it is not a democratic discipline. Majority rule does not hold when an incorrect result is involved. (p. 58)

Hiebert (1999) proposed that the best way to address critiques such as Haimo’s was through research that could “document what students can learn under what kinds of conditions” (p. 9).

Assessment Standards for School Mathematics (ASSM)

The Assessment Standards for School Mathematics (ASSM) (NCTM, 1995) completed the trilogy in 1995, four years after the PSTM. In the interview, Skip Fennell said that the Board planned for the documents in the trilogy to be released every two years, making the ASSM two years behind schedule:

I actually was on the NCTM Board of Directors when the Assessment Standards came out. They were delayed a bit because there was some concern regarding the initial version of those, so that’s why there’s a gap. Notice it’s 1989, 1991, and 1995. I think the original plan was for the Assessment Standards to come out in 1993.

In spite of any publication issues, ASSM was quite timely. The CESSM addressed evaluation in its final section with a call that assessment practices should change to align with the philosophy of the Standards, but that call was largely ignored (McLeod, 2003).
assessment and evaluation, stating explicitly that the *ASSM* was a supplement to, rather than a replacement for, the *CESSM* Evaluation Standards:

> These Assessment Standards have been designed to expand on and complement, not replace, the NCTM’s Evaluation Standards….These Assessment Standards establish criteria for student assessment and program evaluation and elaborate the vision of assessment that was described in the Evaluation Standards. (NCTM, 1995, pp. 1–2)

The *CESSM* also contributed to “the rise of the assessment movement” (Madaus, Clarke, & O'Leary, 2003, p. 1313) in the early 1990s. At the time, there was also an abundance of assessment activity happening in the larger mathematics education community, which contributed to the *ASSM*’s timeliness. Diane Briars was involved with many assessment projects outside of NCTM and described the assessment climate of the time:

> Oh! There was a lot and I don’t know if anybody has written a history of all the assessment things that were going on right then but there was a lot of assessment work going on so the assessment standards were kind of a natural happening right then….I think the reason assessment standards came about is so much was happening in assessment yet there was a feeling that the evaluation part in the *Curriculum and Evaluations Standards* had pretty much been ignored or really underrepresented or under attended to. 70

**The Writing Process**

As with the *PSTM*, the Working Group structure (see Appendix H for members of the writing group) and writing process for the *ASSM* differed from the *CESSM*, but there were some similarities (Lindquist, 2003). In the summer of 1993, 71 the Working Groups

---

70 During the interview, Briars mentioned several assessment projects such as The New Standards Project and The Urban Mathematics Collaborative Project. Discussion of these other assessment efforts in any detail is outside the scope of this study.

71 In our interview, Skip Fennell said that the *ASTM* was published outside of the every-two-year schedule because the first draft was not acceptable for publication.
met again in Park City, Utah with Thomas Romberg as their leader, but the subgroups did not convene at the same time:

The standards working group, with Jeremy Kilpatrick as chair, arrived first to organize the writing tasks. Members of the working groups on external purposes, led by Jane Gawronksi, and classroom purposes, chaired by Diane Briars, arrived a few days later. They adopted the first three standards (on important mathematics, enhancing learning, and promoting equity) from *Measuring What Counts* (MSEB 1993) and included three additional standards (openness, valid inferences, and consistency). They wrote a lengthy discussion of the purposes of assessment including vignettes to illustrate how the new assessment ideas could be carried out in classrooms. (McLeod, 2003, p. 793)

The ASSM Working Group was the most professionally diverse of all the Standards documents (Lindquist, 2003) and included a large number of teachers and school-affiliated members. Included in the group were “K–12 classroom teachers, mathematics educators, educational psychologists, mathematics supervisors, and administrators” (NCTM, 1995 p. ix). Despite these differences, the familiar problem of writing quality remained because “writers were chosen for their knowledge, not necessarily for their accomplishments as prose stylists” (McLeod, 2003, p. 794).

The most significant change in the ASSM writing process was the inclusion of a Resource Group. This group provided a sort of built-in review system as they “were asked for specific comments on the draft [released in late 1993] and suggestions for its revision” (NCTM, 1995 p. ix). Linda Wilson described the Resource Group as “the first line of editors; critical friends.” The review process was not limited to the Resource

---

Group. Over the one-year review process that began in October 1993, the Working Group received more than 2000 reviews (McLeod, 2003). After the review, the Working Group met again in the summer of 1994 to address the comments. The group agreed that the document needed to be shortened and reorganized, but they had difficulty agreeing on what changes should be made (McLeod, 2003). According to Linda Wilson: “I would say Romberg and I did most of the work in shaping the document and getting into its final form.” This shaping was done after the summer 1994 writing session.

The Tone of the Document

Mari Muri described the intent of the ASSM as she understood it:

The intent was to let people know that assessment is more than just giving a grade. That it needs to be fair, it needs to be equitable, it needs to be continuous, and then just coming out with the best for students. It’s not just to give a grade but to find students who need extra help along the way or those who need to be pushed further ahead, so just looking at all of the assessments to serve the students better.

The ASSM Working Group accomplished this intent through several strategic moves including explicitly addressing equity, shifting the language from “evaluation” to “assessment,” and focusing on purpose and intentionality in assessment practices.

One of the six standards in the ASSM was The Equity Standard. NCTM argued that mathematics assessment should acknowledge “students’ experience, physical condition, gender, and ethnic, cultural, and social backgrounds in an effort to be fair” because “students’ knowledge and ways of thinking and learning about mathematics are a complex integration of their backgrounds with their experiences in school” (NCTM, 1995, p. 15). Although the CESSM contained statements about equity throughout (Allexsaht-Snider & Hart, 2001; Martin, 2003) and demonstrated “a commitment to the

---

73 The ASSM working draft was 244 pages; the final version is 102 pages.
belief that all students can learn mathematics and to the objective that all students must learn more, and different, mathematics than in the past” (Hirsch & Coxford, 1997, p. 232), the writers did what they could to eschew equity and avoid making the document any more controversial than it already was. Therefore, the ASSM Equity Standard represents NCTM’s first overt statement on equity in the Standards documents (Becker & Perl, 2003).

Another significant change in the ASSM was the shift in language from “evaluation” to “assessment,” positioning assessment as an umbrella term that included evaluation. The writers defined these terms in the document’s introduction:

In this document, assessment is defined as the process of gathering evidence about a student’s knowledge of, ability to use, and disposition toward, mathematics and of making inferences from that evidence for a variety of purposes….Furthermore, by evaluation we mean the process of determining the worth of, or assigning a value to, something on the basis of careful examination and judgment. The term evaluation as used in this document refers to one use of assessment information. The focus on gathering evidence and making inferences emphasizes that assessment is a process of describing what mathematics students know and can do. (NCTM, 1995, p. 3)

In the CESSM, evaluation is a key term.

Standards have been articulated for evaluating both student performance and curricular programs, with an emphasis on the role of evaluative measures in gathering information on which teachers can base subsequent instruction. The students also acknowledge the value of gathering information about student growth and achievement for research and administrative purposes….Evaluation is a tool for implementing the Standards and effecting change systematically. (NCTM, 1989)

This change in language, albeit subtle, reveals a more student-centered perspective on assessment that is more relational and allows for a more formative process. Linda Wilson placed the impetus for this change in language in the assessment movement that had been stirring in the time since the CESSM:
Now, there were much bigger issues around the whole notion of standards and what these curriculum standards were talking about, and people really didn’t pay attention to [the evaluation standards in the CESSM]. And frankly, a lot happened between ’89 and ’95 in the world of assessment. That was the time of, first of all, changing the language. We went from evaluation to assessment. And we started talking about authentic assessment. There was this whole revolution that was going on during those years and rethinking the way assessment works in a classroom and in the school system.

Perhaps the document’s primary message was that assessment should be intentional, involving careful planning and a clear purpose. Both Linda Wilson and Mark Driscoll addressed the Working Group’s focus on purpose:

We had decided pretty early on that the way things should be organized is that we should have these standards, but there was also this other dimension to assessment, which was about purposes. It was about why are you doing the assessment. Because it looks very different if you’re there for instructional decision-making versus evaluation of a program, for example. (Linda Wilson)

We thought (and we was the entire panel) that any statements about assessment should make sure that people were aware that they were always aligning assessment actions to the purpose for the particular assessment. So is it accountability? Is it to improve instruction? Is it to diagnose? So having in mind what your purpose is should really guide your decisions about what evidence you’re gonna look for and how you’re gonna look for it and what you’re gonna do with the evidence. So it was that kind of alignment that seemed to be the prerequisite step in the assessment cycle or the assessment loop. (Mark Driscoll)

Driscoll’s reference to the assessment loop aligned with the Working Group’s likening of assessment as a process to problem solving:

Think of the assessment process as a problem-solving process. Developing a facility for solving mathematics problems requires experience in thinking, reasoning, planning, communicating, analyzing, and generalizing, plus developing the confidence and disposition to engage in problem solving. Similarly, the assessment process involves planning, gathering evidence, interpreting the evidence, and using the results. (NCTM, 1995, p. 81)
By positioning assessment as process- and purpose-oriented rather than product-oriented, the ASSM encompasses assessment practices on all levels from the classroom to large-scale testing.

If you look at the list of who was in the Purposes Working Group you notice that there were a lot of school people; people that were closer to the classroom level. And so this was about both in and out of the classroom. (Linda Wilson)

Mari Muri, another member of the Working Group, expressed that the emphasis on assessment as a formative process was the ASSM’s strength:

I thought it was actually very strong with the way it came out and the whole idea [that] assessment should be ongoing and it should happen during teaching and not just to give students a grade but to really analyze what students are doing and to help them along the way, kind of the formative assessment. I’m not sure that we ever used that word enough, but that that was kind of the way it changed and evolved from the original outline.

Critique of the ASSM

There was not a significant documented critique for the ASSM. The ASSM Working Group did not begin the writing process until 1993, two years after the release of the PSTM. That delay both helped and harmed the ASSM effort. On the one hand, the key benefit was that the Working Group was able to see some of the aftermath of the CESSM and PSTM and learn from their triumphs and mistakes. For example, the vignettes in the PSTM were well received, so the writers worked that element into the ASSM. On the other hand, however, by the time the ASSM was published, the mathematics education community was Standards-weary. The CESSM sparked significant shifts in the way that K–12 mathematics educators approached mathematics and the PSSM caused them to consider a different perspective on mathematics teaching.
By 1993 when ASSM brought the third wave of the trilogy, new curricula were circulating at such a rate that the community did not have the opportunity to digest it all.

**Lost Documents**

In 2000 when the new standards came out, they organized a reunion of the people from the four standards documents who were at that particular NCTM annual meeting and wanted to attend the reunion. There was a sizeable group of people and they had representatives from each of the four panels get up and give a brief presentation. The last one to get up was Jeremy Kilpatrick for the assessment group and he got up and brought the house down by saying that he represented the Assessment Standards, pause, the Zeppo Marx74 of the four documents. (Mark Driscoll, ASSM writing group)

Driscoll’s story makes apparent the sentiment that all of the PSTM and ASSM writers I interviewed expressed: that these two documents seemed to be lost in the midst of the hype that surrounded both the CESSM and the PSSM. The PSTM and ASSM have been considered to be background documents written in support of the CESSM. These two documents did not seem to get the same attention as the CESSM from within and outside of NCTM. When asked how she saw these documents received on a more local level, Angela Andrews—then a kindergarten teacher—replied:

I didn’t see them received at all. From my perspective…I never saw any of the documents that came after the ’89 Standards have any impact at all…I did not see any impact at all from those documents, even though the assessment document was written wonderfully well….One of the reasons for the 2000 [PSSM] was that they would take the best stuff out of those and bring them to the forefront so that people would look at them because people just weren’t looking at them. It wasn’t affecting the classroom teacher at all. It certainly didn’t affect the textbooks. It

---

74 Zeppo Marx (1901–1979) was the youngest of the five Marx brothers, a family vaudeville act. Zeppo was not originally a member of the group. He replaced one of his brothers who chose to leave the group. Zeppo left the group in the 1930s before they reached the height of their success. When two of the brothers retired in 1949, the most famous Marx brother, Groucho, continued in show business. Zeppo Marx was a talented performer in his own right, but he always remained in the shadows of his older brothers. (http://www.marx-brothers.org/biography/zeppo.htm)
certainly didn’t affect any state testing. It certainly didn’t affect college teaching of how to be a math teacher. They were well written documents that just didn’t do anything….So neither had an impact.

The lack of attention for the PSTM and ASSM does not appear to be intentional. Rather, the CESSM represented significant changes for school mathematics and the proposed curriculum standards became the framework that instruction and assessment would follow.

I think most people found issue with the original document because that sort of set the framework [for] how those other two documents would be implemented. One of the groups that did not wholly accept what NCTM was doing (Mathematically Correct I think it was called) certainly attended to the curriculum document. I think they probably found less to argue in the other two documents. So the document that captures people’s attention in terms of what changes would be made would probably be that original document. In other words, what math is important and how that math should be taught. So even though in the original document it said what math is important and how that math should be taught, when you went to the professional teaching standards about how do we teach, that really wasn’t an issue if you agreed on what was to be taught. You see what I’m saying? So when you agree on what was to be taught, how to teach it was not so much an issue. (Lee Stiff)

In other words, critics considered the core issue to be how the CESSM shaped school mathematics. If these critics had any concerns about instruction and assessment, they believed that they would come into alignment as the curricular issues were resolved. The mathematics education community and others interested in mathematics education were not as interested in teaching and assessment; curriculum was the principal thing.

I would think that they probably didn’t get as much flash in the press. Both of those were aimed at smaller communities. Let me phrase that differently. They were aimed at all the people who were involved with the teaching and assessing of mathematics, but the professionals in those communities, the people who are involved in teacher education programs that would be making the changes that are recommended there and the people who are responsible in the end for large scale assessment programs were the ones who were probably the most direct targets of those publications and those are smaller communities than all of the people who
are involved with curricular decisions and the teaching of that curricular content. Then those people had the charge of taking that to the courses for teacher ed and professional development and to the courses in testing and measurement so I think that there were at the immediate outset smaller target populations for those. (John Dossey)

Bert Waits also described curriculum as his primary interest:

I think the curriculum has to be the most important. Other things are not insignificant. They are necessary but, to me, it’s really all about the curriculum. If you don’t have the right curriculum you’re not going to accomplish the right stuff.

NCTM seemed to agree with Waits that curriculum was the most important area of focus. Lee Stiff described the desires of the NCTM membership as the reason for not drawing as much attention toward the PSTM and ASSM:

I think that perhaps some of this didn’t go as far as the curriculum standards because the membership just gravitated more toward the curriculum standards. So when they talked about what their needs were and what they seemed to have a passion to do it seemed to revolve around the curriculum standards and then toward the teaching standards. The professional teaching standards did get right good attention and stuff was done with it, but it just didn’t take off the same way as the original document. I think the membership just didn’t receive it the same way. The council did put efforts behind the professional teaching standards and you know it did certain things but I guess it didn’t have the appeal that I guess the original document has….The audience has to want it. I think the audience probably wanted the assessment standards much less and I think the assessment standards were probably more difficult for people to wrap their heads around.

Although the membership did not seem to want the PSTM and ASSM as much as the CESSM and these documents did not get the widespread attention that they may have deserved, both of these documents sold well (Lindquist, 2003; McLeod, 2003) and formed the basis for NCTM’s approach to instruction and assessment.
Although NCTM carefully planned the *CESSM*, *PSTM*, and *ASSM* and the activities surrounding them, they were not prepared for the public reception that followed. “None of the authors or others involved in the production of the *Standards* had any idea of what the ultimate magnitude of the response to their document[s] would be” (Schoenfeld, 2004, p. 266). It did not take long, however, for NCTM to recognize and acknowledge the need for another *Standards* document, the *PSSM*.

I think there were people within the organization who felt like “Time is passing us by” and “We need to update what we’ve been saying,” “We need to make some things more explicit.” “We need to…clarify and update the messages.” (Gary Martin)

The process of creating this new document would not be easy and would not follow any established pattern. According to Joan Ferrini-Mundy (2001), chair of the *PSSM* Writing Group,

We learned that the re-formulation of standards in the late nineties would be a challenging process, in that 10 years of experience with the 1989 standards had given the field the opportunity to develop rather strong and varied positions about the perceived messages of the 1989 standards and also about the effectiveness of their implementation and impact. Thus the Writing Group was faced with the challenge of creating a document that would, as we were charged to do, build on the foundations of the original standards, and at the same time take into account the lively debates and implementation difficulties ongoing in the field by addressing them in rational and well-grounded ways. (p. 278)

Although the *PSSM* was a revision of the earlier documents in response to post-publication critique, it was not entirely unforeseen. John Dossey recalled that the

---

*I lose some of the richness of the historical narrative in this section. Previous historical work described the *CESSM*, *PSTM*, and *ASSM* in detail, allowing me to access details of the process beyond what the documents and the narrators provided. No such work exists related to the *PSSM*. A few of the narrators who worked on the *PSSM* remarked that they have never been asked about the process.*
Commission on Standards for School Mathematics envisioned revisiting the *Standards* when they were planning the *CESSM*:

At this point we were even thinking like the Principles and Standards *revision* or reshaping that came out in 2000, that this should be a living document not something that is chiseled into stone.

**Building an Infrastructure**

Immediately after publishing *CESSM*, NCTM began thinking about ways to monitor and update the early *Standards* documents. In 1995, the Board of Directors, led by President Jack Price, appointed the Commission on the Future of the Standards to lead these efforts and, in 1996, approved a revision process, naming the project “Standards 2000.” Standards 2000 allowed the organization to approach the *Standards* process in a new way and NCTM was more prepared for the challenge. The first step was to create a more solid infrastructure to manage the effort. At the core of this infrastructure was the Commission on the Future of the *Standards*. Other structures to support Standards 2000 included the Writing Group, Electronic Format Group, Association Review Groups (ARGs), Research Advisory Committee (RAC), and Standards Impact Research Group (SIRG).  

---

76 The project was titled *Principles and Standards for School Mathematics (PSSM)* when the initial discussion draft was released in October 1998 (NCTM, 2000). I use these names interchangeably in this study, particularly when referring to the process pre-publication.

77 All of these groups were created for Standards 2000 with the exception of the Research Advisory Committee (RAC). Recall that the RAC provided recommendations to the *CESSM* Working Group prior to its publication.
Commission on the Future of the Standards. NCTM appointed the Commission on the Future of the Standards in the same year that it released the ASSM.

The Commission’s charge was to

- oversee the Standards 2000 project and related projects;
- collect and synthesize information and advice from within and outside NCTM throughout the development of the project; [and]
- develop a plan for the dissemination, interpretation, implementation, evaluation, and subsequent revision of future Standards documents. (NCTM, 2000 p. x)

When asked to describe the Commission and its purpose, member Marilyn Mays responded:

My feeling [was] it was a steering committee for the standards. We talked about what it should do. We read preliminary versions of the material. We you know talked about, again, what kind of stance that NCTM should take. You’ve got to walk a fine line between those people who say, “No, we do not need national standards. That’s taking away states’ rights” et cetera, et cetera, and the people who are saying “We’ve got to have national standards because otherwise we can’t have consistent expectations whenever our students go to college or whenever they graduate.” So that was difficult. And the public had very different ideas about it. So we had to not ignite opposition to what we were doing but at the same time, we had to encourage confidence among the people who were hoping for some kind of direction from their leadership.

Writing Group. The Board charged the Writing Group (see Appendix I for members of the Writing Group) was to write standards that:

- build on the foundation of the original Standards documents;
- integrate the classroom-related potions of Curriculum and Evaluation Standards for School Mathematics, Professional Standards for Teaching Mathematics, and Assessment Standards for School Mathematics; [and]
- are organized into four grade bands: prekindergarten through grade 2, grades 3–5, grades 6–8, and grades 9–12. (NCTM, 2000 p. x)

Barbara Reys, chair of the writing group for grades 3–5, interpreted the charge:

We were charged to develop a revision of the earlier 1989 Curriculum and Evaluation Standards for School Mathematics and to work to clarify any
ambiguities. There were actually three previous documents and our charge was to see if we could meld the important messages from all three of those documents into a revised and updated standards document. So that created a lot of discussion because we weren’t sure how much time to spend on curriculum standards versus assessment standards and professional standards for teaching.

Angela Andrews, member of the Pre-K–2 group, thought that the *PSSM* was more than simply a revision:

[NCTM] said it was a revision. It was an update. We added technology. There were some new issues that had arisen in math education. There was some new math that needed to be included which was all true. Technology needed to be included. They wanted to put together the documents about assessment and professional growth and equity all into one all-encompassing update and all of that is true. But the real reason was to try to diffuse the Math Wars and say: “This is what we meant when we said that back in 1989. We didn’t mean it that way. This is how we meant it.” So it was a defensive document. …I’m telling you that’s what we did. For three years [1997–2000] we defended the 1989 document and tried to make it more palatable to our assistors and our resistors and that’s why the 2000 document was written.

The process of forming that Writing Group was similar to previous efforts in that each participant was part of a network of familiarity, but there were some differences. In her interview, Carol Malloy indicated that she had been involved with NCTM as a member of the conferences committee and was an active member of the Benjamin Banneker Association, an NCTM-affiliated organization. In addition to these and other professional accomplishments, Carol Malloy indicated race as a contributing factor for her inclusion in the Writing Group: “I’m sure that they were looking at ‘Which African Americans can we get on the panel? Which people do we want to select?’ and I just happened to be one.”

---

78 Carol Malloy served as President of the Benjamin Banneker Association (BBA) during the *PSSM* writing process (1997–1999). BBA is an NCTM affiliate organization dedicated to the mathematics education of African American children.
Electronic Formatting Group. New possibilities for electronic communication and dissemination available in the late 1990s meant that NCTM had to consider how to use technology and electronic formats in service to the Standards efforts. The Electronic Formatting Group was responsible for taking advantage of those opportunities. The charge was to

- think of alternative ways to present and distribute the document that would result;
- envision ways in which technology-based materials could be incorporated in the Standards;
- keep the Standards 2000 Writing Group up-to-date on uses of technology; [and]
- assist in the work of the Standards 2000 Writing Group by finding examples of appropriate uses of technology. (NCTM, 2000 p. x)

NCTM was very excited about the efforts of the Electronic Formatting Group that “shaped an electronic edition of the document that [moved NCTM’s] efforts into the exciting new age of online publishing” (Commission on the Future of the Standards, 2000, p. 336).

Association Review Groups (ARGs). As with the Resource Group of the ASSM, the ARGs functioned as a type of built-in review system. In 1997, NCTM President Gail Burrill extended invitations to all members of the Conference Board of the Mathematical Sciences\(^{79}\) to participate in the Standards 2000 project by forming ARGs that provided a

\(^{79}\) The current member societies of the Conference Board of Mathematical Sciences (http://www.cbmsweb.org) are: American Mathematical Association of Two-Year Colleges (AMATYC), American Mathematical Society (AMS), Association of Mathematics Teacher Educators, American Statistical Association, Association for Symbolic Logic, Association for Women in Mathematics, Association of State Supervisors of Mathematics, Benjamin Banneker Association, Institute of Mathematical Statistics, Mathematical Association of America, National Association of Mathematicians, National Council of Supervisors of Mathematics, NCTM, Society for Industrial and Applied Mathematics, Society of Actuaries, and TODOS: Mathematics for ALL. I was not able to locate a list of past member societies.
way for organizations interested in mathematics education to have input in the process (Jackson, 1997). “Over the course of the project, fourteen Association Review Groups were formed, and five sets of questions were formulated and submitted to these groups for their responses” (NCTM, 2000 p. xi).80

In November 1996, the Commission on the Future of the Standards sent four questions to the ARGs regarding the first three Standards documents. They sent a second round of questions about algorithms in April 1997. Two additional sets of questions were sent in the fall of 1997 (how changes in contemporary mathematics affect school mathematics) and the spring of 1998 (discrete mathematics and important topics in geometry). The ARGs submitted consensus reports responding to these questions and those reports were distributed to the writers. They also responded to the review draft in the fall of 1998 (Ferrini-Mundy, 2000).

Research Advisory Committee (RAC). The RAC made recommendations during the CESSM review process at the request of then-President John Dossey, one of which was a clear articulation of the research base for the document. According to Kilpatrick (2003), “the documents [CESSM, PSTM, and ASSM] were not well anchored in either research or theory” (p. 1). Alan Schoenfeld offered reasoning for the CESSM’s lack of empirical foundation:

80 The organizations that formed ARGs were the American Mathematical Association of Two-Year Colleges, the American Mathematical Society, the American Statistical Association, the Association for Symbolic Logic, the Association of State Supervisors of Mathematics, the Association for Women in Mathematics, the Benjamin Banneker Association, the Institute for Operations Research and the Management Sciences, Mathematicians and Education Reform Forum, the Mathematical Association of America, the National Council of Supervisors of Mathematics, the Research in Undergraduate Mathematics Education Community, the Society for Industrial and Applied Mathematics, and the Society of Actuaries.
The people who wrote the '89 standards knew the research and knew it well. Tom Romberg who chaired the committee is a researcher and they were fully aware of what the research said about what’s productive thinking, teaching, and learning in mathematics. If you look at the '89 standards, what you’ll find is there were virtually no references or citations. The reason for that is that it was essentially an internal document written for the math teachers who were the constituency of NCTM and when it was written NCTM wasn’t a) aware of the fact that it was going to turn out to be as big as it is, [and] b) that it was going to wind up in the political-intellectual arena. It was a service document for NCTM’s teachers, trying to say, “These are the things that we need to focus on in order to give American kids the kind of math that we know they need.”

In the Standards 2000 project, the RAC led the efforts to provide that foundation for the PSSM. They began by commissioning white papers “summarizing the current state of education research in eight areas of mathematics teaching and learning to serve as background for the Writing Group” (NCTM, 2000 p. xi). With NSF support, they also hosted the Conference on Foundations for School Mathematics in Atlanta, Georgia in March 1999. The RAC combined the papers submitted for this conference with the white papers to form *A Research Companion to Principles and Standards for School Mathematics* (Kilpatrick, Martin, & Schifter, 2003). This volume represented an effort to address the critique that the earlier *Standards* documents had a weak or nonexistent research base.

**Standards Impact Research Group (SIRG).** The RAC and the Commission on the Future of the *Standards* proposed the SIRG to the NCTM Board, which established the committee in 1999. The SIRG functioned as an arm of the RAC dedicated to tracking the impact of the *Standards* and addressing questions such as

What does ‘implementing the *Standards*’ mean to various constituencies?  What have been the results of such effort on classroom practice, student learning, and educational policies?  And what kinds of professional development and other supports have been shown to facilitate
implementation of the *Standards*? (Research Advisory Committee of the NCTM, 1999a, p. 485)

Members of the SIRG served a five-year term.

The Board charged the SIRG

with the responsibility to (a) inform NCTM leadership of the impact of the *Principles and Standards for School Mathematics* (NCTM, 2000), focusing on how this knowledge can be used to continue to guide the process of Standards-based reform; (b) facilitate the establishment of a program of research studies related to the NCTM Standards and Standards-based reform; and (c) oversee a general program investigating the effects of *Principles and Standards for School Mathematics*. (Research Advisory Committee of the NCTM, 2002, p. 314)

The SIRG “[played] a catalyzing role, ensuring that the most important questions and issues [were] being raised and addressed” (Research Advisory Committee of the NCTM, 1999b, p. 485). They monitored research related to the *Standards*, “[defined] questions and [sought] answers that would be of use to NCTM in guiding its activities” (Research Advisory Committee of the NCTM, 1999b, p. 485). Although the group was responsible for encouraging research related to the *Standards*, the RAC made it clear that the SIRG was not only seeking affirmation for the effort (Research Advisory Committee of the NCTM, 1999b; 2002).

**The Writing Process**

Before assembling the writers, the Commission on the Future of the *Standards*, in accordance with its charge, surveyed both the NCTM membership and the mathematics community concerning what they believed should be a part of an updated version of the *CESSM*. Feedback from these surveys suggested:

- Maintaining the “process” standards (i.e., problem solving, communication, reasoning, and connections, the first four standards of the grade band chapters in the *Curriculum and Evaluation Standards*).
• Adding more examples of varying kinds, taking into account changes in technology.
• Including research evidence that the principles behind the standards lead to improved mathematics teaching and learning. (Lindquist as cited in Martin & Berk, 2001, p. 330)

These suggestions provided a launching point for writing the *PSSM*.

In 1997, the Board and the Commission appointed the Writing Group. They met for two- or three-week summer sessions in 1997–1999 with occasional meetings during the year; the summer meetings were held in the Northern California wine country. The meetings in the first summer began with discussions about the previous documents and their aftermath. James Sandefur recalled:

A lot of the first summer was spent looking at what had happened from the first document and the reasons why we felt that a second document needed to be written. I think some of it was that the first document was very forward-looking. They had not put in a lot of things that I think they felt were self-evident and so when they weren’t put in I think a lot of people thought “Oh, so they didn’t want those things in mathematics.” So there was a lot of misunderstanding of the first document and we were trying to clear that up.

In an effort to build camaraderie among the writers and to create a more cohesive product, the process alternated among whole group meetings, grade band meetings, and interest group meetings where writers would meet together to write about common interests such as discrete mathematics or technology. Several narrators described the writing process:

The big meetings were crucial to everything that happened and Joan was a very, very good leader and so were the people who were the leaders of the teams. We sat in different places in the room but there were some tensions because some people like to talk too much and others don’t talk enough. But a lot of the decisions came out of that group and the conversations that we had. I can see the room but I can’t hear everything. There were so many conversations and so many times but what the room did was build a community among us. We could go back to our rooms and to the suites where we actually were and do our work and then we
would come back and talk about what we had done but it’s not all clear. All I know is that the process truly worked very, very, very well. I loved being able to select the areas that I wanted to write in. The people that we had in my group, some of them were really middle school. I was not a real middle school person but I did write at the middle school level in some of these papers that I had written. It was invigorating. It was just one of the most wonderful experiences I’ve ever had as an educator. The topics that I chose were geometry and measurement and equity to make sure that equity was overriding everything. (Carol Malloy)

We met on a daily basis and we did work in grade band units but I know two or three hours every day for those three years were spent working together trying to get some kind of cohesive thinking, however I don’t think it was particularly successful because of the strong opinions of the heads, whether they were the titular head or the real head of each group. They pretty much continued to write like they saw the audience. (Angela Andrews)

As well as I can recall, we started with “What are the issues?” We really went back to the beginning and we tried to develop consensus. We operated by consensus. We certainly never voted. We had at times really intense conversations. I think it’s safe to say we really had a good time as well. We were looking at what should a vision of high school mathematics be in addition to how should it be related to what comes before and what comes after but it was almost all as a group. We had to do a little writing the first summer. We had to do a lot the second summer and then we had to do rewriting the third. (Alfred Manaster)

While we were at the summer writing group meetings, again, the bulk of the work happened and those were divided up: there were times when the whole group was together to discuss common issues and then there were times for the individual writing groups to work. . . . Because we had no model for the product we were to create, we spent lots of time talking, discussing issues, reviewing state standards and current research related to teaching and learning grades 3–5 mathematics before we began to write. Since all four grade band groups were to use a common style or template, collective decisions about format and how each of the grade band chapters would be organized and what common elements there would be were still to be made. There were a lot of starts and stops in our work because until those common elements and format was ironed out we couldn’t proceed too quickly on our work. (Barbara Reys)

**Tone and Structure of the PSSM**


*PSSM* took a very different tone than its predecessors. Consistent with the writing process, the document itself was more democratic due to the variety of feedback that the Commission on the Future of the Standards solicited during the review process (Schoenfeld, 2004).

It was the height of the math wars. We’re almost forgetting what that’s like but it was really rancorous times with high profile critics of NCTM, of the standards, and of that whole thrust….In some sense it was to I’m not gonna say pacify the critics, but to make clear to the critics what NCTM’s real position was rather than some of the interpretations that were coming out….It was, I think, really an unprecedented effort to engage a lot of audiences in the process throughout particularly mathematicians but other audiences as well….The discussion draft went out to a lot of different groups to get their input and their perspectives on that. (Gary Martin)

**Vertical alignment.** In the previous quote, Barbara Reys referred to common elements across grade bands. This commonality was an aspect of the document that the Commission on the Future of the Standards emphasized; they wanted a document that was aligned vertically. Sue Eddins discussed her perception of vertical alignment in the *CESSM*:

My understanding was that in the initial writing there were three separate committees and they kind of wrote their standards how they wanted to. I don’t mean there wasn’t any coordination, but basically there wasn’t any drive to make the middle school group align with the high school or the elementary school be built on by middle school. There wasn’t any real coordination effort between the levels so that graphing standards might sound very different in the three different grades….And there were no common standards across grade levels. What had evolved since 89 was that the standards written by states were organized generally around five content areas in math. Some of them did carry through and had common strands or common domains, not all did that, but most of them ended up with algebra, geometry, number, statistics, and data analysis. They had kind of the same feel. So I think part of the impetus was to try to pull all of that back together.

The Writing Group accomplished such vertical alignment by ensuring that a significant portion of the writing time was spent in either whole group settings or mixed groups.
across grade bands (i.e., one person from each grade band would assemble in a group to discuss geometry across the grades).

The three weeks in the summer was spent, I don’t want to give percentages, but a very substantial amount of our time was spent as a collective around the table hammering out various issues….One of them was vertical continuity so if you think about algebra in 8th or 9th grade, where you come down on that, that had to be one where we agreed as a collective on the stance that we would take. There were lots of conversations about that. Any issue that came up that was at the discretion of the standards group as a whole got decided by the group as a whole….There’s a picture of the vertical strands (except the picture’s horizontal). It shows each of the five content standards and the different emphases over the grade bands; number getting a lot in the beginning and then tapering down; patterns getting not that much in the beginning and then opening up into algebra. All of those were collective decisions and what happened was we decided as a whole. Groups would go off and write their stuff and the collective would look at the whole thing and see if it meshed and was coherent and fit in with what we had agreed as a group. 

(Alan Schoenfeld)

The early childhood community was excited to be part of a serious conversation in mathematics education. The CESSM began with kindergarten the first grade band spanned grades K through 5. The Commission on the Future of the Standards chose to break up the younger grades into two grade bands, Pre-K–2 and 3–5, to the delight of early childhood educators. Angela Andrews, herself a kindergarten teacher, expressed that delight:

The other thing I think was really great…was for the first time the preschool child was considered….People did not think math started at birth and we needed to start directing good math instruction even from the earliest levels. I think that was a significant change….And it was tremendously appreciated by the early childhood community who had always felt like “Who are we? Chopped liver?” It was a good document for Pre-K. It gave some direction and all of the things that you see flowing out of preschool and early childhood now started here [with] the 2000 document not the ’89 document….So in my eyes (again let me get my lens, I’m a preschool person) that was a major contribution.
This addition was a clear acknowledgement that “during the years from birth to age four, much important mathematical development occurs in young children” (NCTM, 2000, p. 73) and that the mathematical needs of the youngest learners were different from those in grades 3 through 5.

**Jargon, accessibility, and audience.** A consistent critique was that the writers used too much jargon. One reader commented, “The readability needs to be improved. The text is dense and inconsiderate” (Commission on the Future of the Standards, 1999, p. 807). Angela Andrews noted jargon as an issue present during the writing that she took on as her own:

I actually got a role during the three years that we worked on that. I was called the jargon policeman and they gave me a badge that said that. I would cut through the jargon. You know when mathematicians are talking with each other they don’t have any idea that the rest of us don’t know what in the heck they’re talking about and I would say “What? What does that mean? Explain that again. Can you say that so that a classroom teacher can understand? Not someone that has a PhD in mathematics.” I was constantly doing that. Believe it or not, I wasn’t an irritant….They kind of appreciated that role.

The writers and editors responded to the issue of readability in three ways:

They (1) set strict page limits for each section in the rewritten version; (2) consulted an editor to help create a more accessible, readable style; and (3) worked with a graphic designer to create a format to help the reader navigate the document. (Commission on the Future of the Standards, 1999, p. 807)

It is possible that some of the language challenges stemmed from a lack of clarity regarding the audience for the PSSM. Officially, the document reads:

[The PSSM’s] audience includes mathematics teachers; teacher-leaders in schools and districts; developers of instructional materials and frameworks; district-level curriculum directors and professional development leaders; those responsible for educating mathematics teachers; school, state, and provincial administrators; and policymakers. In addition, the document can serve as a resource for teachers,
mathematicians, and others with an interest in school mathematics.  
(NCTM, 2000 p. ix)

Gary Martin named audience as a consistent point of discussion throughout the writing process:

Who was it for?...There were big discussions over that….That was a big topic of discussion because I think there were times early on where the audience kept shifting a little bit. Were we writing for the classroom teacher or are we writing for the teacher leaders and administrators and the policy people and curriculum people? So we ended up…writing for everyone.

“Writing for everyone” was quite difficult. With such a broad and unclear audience, the document was sure to be found lacking in direction. When asked about his understanding of the audience, James Sandefur responded with a laugh, “That was really difficult because it’s one document that was trying to reach a variety of audiences and that’s next to impossible.” As with the CESSM, the writers hoped for direction from NCTM regarding the audience, but did not get it.

In retrospect I wish when NCTM gave us the job they had made that decision for us and said, “Look, this is who your audience is” because we spent a lot of time [on that issue]. It we could have just decided on that one thing. That’s one reason why I think the 2000 document is slightly disjointed because even as it was put together you can almost see this part was written for this audience and this part was written for this audience and it reminds me of the old saying: “Focus. If you try to chase two rabbits, they’ll both escape.” I think we were trying to chase five rabbits and I think they all escaped.

Andrews addressed the possibility that, by addressing several audiences at once, the PSSM may have been spread too thin and, therefore, not as effective as it could have been.

**The Principles.** Another significant element of the PSSM that came about from the whole group meetings was the Principles that “describe particular features of high-
quality mathematics education” (NCTM, 2000, p. 11). Alan Schoenfeld described how the Principles came about within the Writing Group rather than as a directive from NCTM:

At one of our summer sessions (it was probably the second one) we decided that we needed a statement of principles that were over-arching that should serve as the foundation for everything that followed later. That’s where the principles came from. It came from the authors. So it was originally given the informal name “Standards 2000” and we had that for probably two years; then the group came up with the notion of grounding in principles and decided “These are so important we’re going to call the volume Principles and Standards.” All of that was a function of the group itself, not a mandate that came from NCTM.

The six Principles—Equity, Curriculum, Teaching, Learning, Assessment, and Technology—were unrelated to content and process. Instead, “the [described] critical issues that, although not unique to school mathematics, [were] deeply intertwined with school mathematics programs” (NCTM, 2000, p. 12).

The Principles seemed to be the most appropriate place to make a statement on the role of technology in mathematics classrooms. Although the writers agreed that times had changed in such a way that they could not avoid discussing the role of technology in mathematics education, they did not agree on what that role should be. In the Grades 9–12 writing group, many of the writers were college and university professors who had not yet embraced technology in the classroom. Alfred Manaster, one of the university mathematicians in the 9–12 writing group, expressed the need for care regarding the group’s position on technology:

I was a little bit concerned about technology. I felt that there were some people, in particular one of the members of the 9-12 group, who were over-emphasizing technology. On the other hand, I also felt at the time that there were a lot of mathematicians who under-emphasized it. In the end I was pretty comfortable with the stand that was taken. Reading parts of it again recently I think that the document does a good job of saying
“We don’t know what the future holds. There is going to be a lot of technology out there and we need to find ways to take advantage of it without compromising the integrity of mathematics education.” So in the end I was really comfortable with what we did. Again, there was a little bit of tension at times because you really don’t have to use a graphing calculator to do everything that you’re doing and some people wanted to but I think the document did not come out saying that. The document came out in a pretty good place. It was, “Yes, technology is here and use it when it’s appropriate,” but it didn’t say, “We know when it’s appropriate” and I think we still don’t [know].

Sue Eddins recalled that the leadership added M. Kathleen Heid to this grade band group in the second summer to assist with discussions of technology.

The Principles also became the home for the ideas from the PSTM (in the Teaching Principle) and the ASSM (in the Assessment Principle). Gary Martin described his understanding of the intent of the PSSM:

The intent, I think, was to take the 89 standards and kind of fold in the professional teaching standards and the evaluation [assessment] standards and kind of come up with one grand updated contemporary document that would guide the field for the next decade.

Despite Martin’s perception of the intent, the PSSM was not exactly a mash-up of the three earlier documents. Perhaps for some of the reasons that the PSTM and ASSM did not receive much attention, the PSSM’s focus was curriculum, resulting, again, in limited attention to instruction and assessment. Gary Martin continued:

If the goal was to incorporate the ’91 and ’95 standards, I don’t think that really happened. Elements of them were there but certainly PSSM did not replace either the ’91 or the ’95 documents in my mind. It did kind of situate them within the broader standards vision, but I don’t think that you could in any way argue that the little few pages written on assessment encapsulate all of the important messages in the Assessment Standards or that the Teaching Principle really captures the ’91 document. I think that was just too hard of a task.

The Principles also provided a space for the writers to make comments that were previously considered controversial. The first Principle in the PSSM was The Equity
Principle. I believed that placing the Equity Principle first was a political statement and the narrators confirmed that hypothesis.

At that particular time I was the president of the [Benjamin] Banneker Association and they knew that that [equity] was going to be my emphasis. So I would always ask questions or push in the direction that I thought we needed to go and sometimes it would take longer for people to catch up but eventually they [did] and those that [didn’t were] quiet. I guess the way it played out was not the way I thought it would because I thought it would be harder but it was almost like a lot of these people who were in the room understood that they weren’t doing what they needed to do for African American and Latino and Native American children and they didn’t know what to do. So they needed to hear conversations with others who did. I think there were only two Black people who were in the room regularly but the conversations were from people who taught African American kids and Latino kids and so it wasn’t just us talking….It wasn’t a token effort….At the end of the day everyone was on board that equity should go first because this is something that we have never done before and that teachers haven’t been talking about and they have to talk about it. (Carol Malloy)

[In response to my question, “Was the Equity Principle intentionally placed first?] Absolutely and labored over very hard because frankly it wasn’t there. If you do a hard review of the Curriculum and Evaluation Standards or any of the trilogy where’s equity? It’s nowhere in a direct way. There was criticism even within our own community….There were criticisms from our own community whether it was the Benjamin Banneker Association or others who said loudly and justifiably “Who are our students?” and “Where is equity?” Again, very justified. (Skip Fennell)

As a significant political statement, the Equity Principle became the basis for much of the equity work in mathematics education that followed. In 1993, the NCTM task force on multiculturalism and gender in mathematics recommended that the NCTM publish a series of books in support of the CESSM’s “mathematics for all” message (Strutchens, 2000). The publication of the Changing the Faces of Mathematics series (Edwards, 1999; Hankes & Fast, 2002; Jacobs, Becker, & Gilmer, 2001; Ortiz-Franco, Hernandez, & La Cruz, 1999; Strutchens, Johnson, & Tate, 2000), edited by Walter
Secada, coincided with the *PSSM* and provided additional fodder for the equity conversation.

**The Review Process**

The NCTM leadership was particularly proud of the collaboration built into the development of the *PSSM* and the credibility that the openness afforded the document.

Glenda Lappan noted:

> I felt really good about that because it wasn’t just a group of NCTM people coming together and writing this second document. It was a *broader* spectrum of NCTM people coming together but with input from a much broader perspective….So we had feedback that was extraordinarily helpful to us and I felt really good about that. I felt like we did that second set of standards in a way that it would be hard for people to say that it was just a group of us coming together to put our prejudices forward. This was truly a document that in its final instantiation was something that had been seen by so many different people from different communities that you had to view it as a national document.

Continuing the effort toward transparency, the Writing Group released a draft of the *PSSM* in 1998 for review. They distributed 30,000 copies of the draft and made it available online. Respondents were encouraged to submit open-ended responses and the Commission invited 25 commissioned reviewers, including mathematicians and researchers, to review the document. The RAC and the authors of the RAC white papers also reviewed the draft (Ferrini-Mundy, 2000; Martin & Berk, 2001). Nearly 600 reviews were submitted.

The scale and execution of the review process left Alfred Manaster in awe:

> That was one of the most awesome parts of this looking back on it. I can’t remember the name of the software that they used but they had a group who read every comment; they tagged each comment; they had an extensive system of organization so we could see things any way we could imagine seeing them. I thought that whole process was absolutely amazing. On the other hand as a writer I remember being awed by the process I remember also being overwhelmed by the number of responses.
As Project Director and NCTM Director of Research, Gary Martin was responsible for managing the review process.

The discussion draft went out to a lot of different groups to get their input and their perspectives on that. That was actually kind of the major job that I had as Director of Research working on behalf of the Commission. I gathered the input and actually did a very detailed analysis of the input using qualitative research methods, developing themes, and coming up with a really detailed report of what the reaction was to the draft.

Martin led a research team that used the qualitative data analysis software NUD*IST to categorize and code the responses. The result of the analysis was “a set of 19 issues that needed to be addressed by the writers in creating the final document” (Martin & Berk, 2001, p. 333).

**Incorporating Different Voices**

By 1996, 49 states had developed curriculum standards, many of which were based on the *CESSM* (Martin & Berk, 2001). The *PSSM* Writing Group referenced these state standards. The Writing Group also used contextual information that the *CESSM* did not take advantage of. There was little or no mention of supporting research or national or international assessment data in the *CESSM*, but the *PSSM* writers did not have the luxury of not taking care to address these contextual elements. The *PSSM* Writing Group also had to use “relevant research as a basis for many of the content recommendations” (Lindquist, 2001, p. 288). They had access to an extensive library of research along with the RAC white papers. Advanced graduate students in mathematics education also “conducted a careful examination of the research cited” (Martin & Berk, 2001, p. 331). In addition to making research available to the writers, the leadership constructed the Writing Group so that “each grade band included at least one mathematics education
researcher who was well versed and active in educational research” (Martin & Berk, 2001, p. 331).

The Writing Group also had to acknowledge the three National Assessments of Educational Progress (NAEP) that had been given since the CESSM in 1990, 1992, and 1996 as well as the Third International Mathematics and Science Study (TIMSS). At that point, NAEP had become an assessment state mathematics leaders know, and politicians were aware of the overall results. It had moved from a powerful research tool giving results of the nation to a political tool fueling policy decisions at the state level. (Lindquist, 2001, p. 287)

In order to maintain both professional and political credibility the Writing Group had to show that the PSSM was not only informed by research and assessment data, but that the proposed approach would be the answer to improving assessment results.

**Dissemination of the PSSM**

The PSSM was released at the 2000 NCTM annual meeting in Chicago. Each member received a copy and, just one year later, NCTM had sold nearly 45,000 copies (Ferrini-Mundy, 2001). As with the earlier documents, an Executive Summary was also available for distribution. In addition to the bound version, interested parties could also access the PSSM electronically through the NCTM website.

The electronic version of the PSSM presented a new challenge for NCTM. The document was much more accessible through the electronic medium. Skip Fennell described how he took advantage of that accessibility for his teacher education courses:

You could get access to PSSM online for 90 days, which was perfect because that was a semester. So I could have my students go to NCTM online, look at PSSM, look at what was said, and then use that to think about how they might plan a lesson or engage in discussion.
Making the *PSSM* available for free, even for a limited time, was excellent for accessibility, but NCTM also depended on the revenue from the publication.

Well <laughs> making it available electronically was a Board decision….I think the Board made it available electronically because of the world in which we live. That’s what made sense and because we wanted people to have access to it that’s what made sense and it probably was a very good thing to do and certainly it put it out there and people had access to it then. They have access to it now. So it was a good thing to do from the perspective of getting the information out. So that was a wise thing….I don’t know that if I would have voted that way if I’d had a chance. <laugh> But the only reason I wouldn’t have voted that way is because, I don’t know if anybody else has said this to you or not but the standards documents was also a revenue generator for the council because initially the standards documents were sold.

As with the earlier documents, NCTM funded the *PSSM* effort and had to reconcile its desire to recoup those costs with the desire for accessibility.

**Critique of the PSSM**

**Mathematicians.** Despite Commission on the Future of the Standards’ intentional efforts to create the *PSSM* in a process that was transparent and encouraging of input from all interested parties, the document was not without critique. Mathematicians publicly endorsed the effort. The member organizations of the Conference Board of Mathematical Sciences wrote a joint letter of appreciation that was included in the *PSSM* (NCTM, 2000 p. xv). Hyman Bass, then president of the American Mathematical Society, said:

I think that the new PSSM document is an extraordinary achievement that has been well informed by the advice that was sought from other professional communities. The NCTM has made serious and bona fide efforts to ground its policy documents in whatever research is available and in solicited advice from other professional communities. (Jackson, 2001, p. 314)
Despite these endorsements and NCTM’s efforts toward transparency, mathematicians continued to criticize the work. Askey (1999) argued that there were three elements for a successful mathematics program that he did not see in the NCTM efforts:

Like a stool which needs three legs to be stable, mathematics education needs three components: good problems, with many of them being multistep ones, a lot of technical skill, and then a broader view which contains the abstract nature of mathematics and proofs. One does not get all of these at once, but a good mathematics program has them as goals and makes incremental steps toward them at all levels. (p. 106)

Although critique from mathematicians was welcome, the vitriol that often accompanied such critique was frustrating. Sue Eddins expressed frustration with the tone of feedback from some of the mathematicians:

I wondered why their universities were paying these professors because they were so busy commenting on every set of standards that came out, especially ours. I’d get pages, and pages, and pages, and pages, and pages from some of them. Not complimentary. I can remember saying to one of them “I’ve appreciated all of your comments because we don’t want any mathematical errors in this and I just wish you could not assume that we’re stupid because we made some. You could say it with better manners.”

Bass also chided mathematicians who refused to respond constructively to NCTM’s work:

The rhetoric of mathematicians who publicly protest every single fault and detail in everything the NCTM does is simply not doing work that’s going to move us forward. The NCTM has demonstrated that it can productively accommodate constructively rendered criticism. (Jackson, 2001, p. 314)

---

Richard Askey is Professor Emeritus of Mathematics at the University of Wisconsin–Madison. He has contributed to Mathematically Correct and has written several essays on mathematics education (see [http://www.math.wisc.edu/~askey/](http://www.math.wisc.edu/~askey/)).
At the beginning of the *PSSM* process, Jeremy Kilpatrick, a member of the Commission on the Future of the Standards, made a similar plea in response to Hung-I Wu82 (Wu, 1996):

> The most constructive part of Wu’s critique, by far, is the final section in which he urges mathematicians to become more involved in mathematics education, contributing ideas to the revision of the NCTM standards documents [the *PSSM*], helping to improve the training of prospective teachers, and participating directly in curriculum change. Many mathematicians have already been involved in the current reforms for some time, but greater participation—encouraging or critical—can only be beneficial. To progress as a field in how we deal with efforts to improve school mathematics, however, we need only greater participation but also a higher level of discourse about those efforts. Critiques need to be based on substantive analyses that are grounded in evidence. They should consist of more than capricious assertions and bleak prophesies. We need to move from anecdote to analysis, from evisceration to evidence, from diatribe to dialogue. (Kilpatrick, 1997, p. 960)

Judith Roitman added her voice to the calls for conciliation:

> Our community generally does not reward or honor this sort of time-consuming, challenging, socially important, and intellectually interesting work. Until it does we should not complain that our students come to us un-prepared nor wonder why so few mathematicians are involved in educational policy. (Roitman, 2000, p. 5)

In the end, it seems that the math wars caused NCTM to understand that some mathematicians, such as those aligned with Mathematically Correct, would never be satisfied with its efforts.

**Reaction from writers of earlier documents.** As would be expected, the writers of the *CESSM* were very interested in the *PSSM* and their reactions were mixed. Bert Waits thought that the *PSSM* represented a missed opportunity:

---

82 Hung-His Wu is Professor Emeritus of Mathematics at the University of California, Berkeley. He has contributed to Mathematically Correct and has written extensively about mathematics education reform (see [http://math.berkeley.edu/~wu/](http://math.berkeley.edu/~wu/)).
I’m very prejudiced. I’m biased. The ‘89…standards were to be a great effort that I didn’t think would go anywhere, but then when it did I was thrilled and I just think it really helped a lot of teachers to make math more meaningful to so many hundreds of thousands of students. I thought the 2000 standards had an opportunity to amplify, refine, and advance the vision of the ’89 standards but they didn’t do that in my opinion….I was very disappointed at the team that wrote the 2000 standards because they back pedaled and did not take advantage of building on what we had established to move the community forward. They took a step backwards.

James Schultz was impressed with the effort toward vertical alignment: “They made much more of an effort to make a consistent document across all of the grade levels.”

Nel Noddings thought that the Equity Principle was problematic:

This is actually what I’m talking about when I say that our ideals along this line have been corrupted. Anyone who looks at the commitment to equity and to rigorous mathematics would have to say “Yes I agree” but then if you’re really thoughtful you have to say, “What do you mean by that?” If you mean by equity now everyone will be forced into academic mathematics, then I back away. I back away because having taught as long as I did (and I liked my students we got along really well) but the difference between those students who were passionately interested in mathematics and those who were doing it because they had to was enormous and will continue to be enormous. We should pay some attention to that instead of insisting that everybody get exactly the same batch of stuff and when it doesn’t come out that everybody is equal at the end, then what? Well then it’s the teacher’s fault. That’s ridiculous.

There was also some disagreement on the integration of the PSTM and the ASSM in the PSSM. William Speer saw the PSSM as a successful combination of the three prior documents:

What we have is a new document that came out in 2000 that took, really, all three standards and embedded them into one new document. The 2000 standards are a compilation of the three documents that went before it. I know that not everybody recognizes that, but most people do. It’s clearly a compilation of the three standards that went before.

Linda Wilson disagreed. When asked how she thought the PSSM writing group incorporated the ASSM, she replied:
I don’t know what they did. I’m sure that it was there and there was some crossover in people who worked on both documents. I know that when I looked at the Principles and Standards I was disappointed that assessment didn’t have a bigger role to play.

Speer continued to comment on the heartiness of *PSSM*:

If you didn’t experience the history and the development, if you found yourself looking at the 2000 document and that was your first exposure to NCTM standards you just haven’t been part of this history. You haven’t seen what came before. That was a huge volume. I don’t wanna wax religiously, but that was like Moses coming down from the mountain, not with 10 commandments, but it was more like 46 commandments. That was a lot to take in if it was your first exposure to standards. I started to say that would be my only criticism. I don’t think it’s really a criticism. It’s just a recognition that there’s a lot there and it can be a little bit intimidating. I know that back in 2000, 2001, and 2002, and even a little bit beyond, some of my colleagues used the standards as a textbook for their methods class in university. Probably not a very wise decision because it just blew people away as an introduction. It’s just too much to take. It’s like overdosing if it’s your first exposure.

Speer’s comments indicate that *PSSM* was not friendly to a pre-service teacher audience or an audience that was otherwise unfamiliar with mathematics education.

**Summary and Conclusion**

NCTM published the *Standards* as resource guides (Crosswhite et al., 1989; Ferrini-Mundy, 2000; Hekimoglu & Sloan, 2005; Martin & Berk, 2001) for state and local curriculum developers to develop a mathematics curriculum that would prepare students for the challenges of global competitiveness in the Information Age. Ball (1994) describes the *Standards* as a “sketch [of] directions and commitments, principles and aspirations” (p. 5). This set of documents represents the first attempt by an organization representing teachers to offer guidelines for school curricula on a national scale (Addington et al., 2000; Crosswhite et al., 1989; Ferrini-Mundy, 2000).
The historical narrative of Standards-based mathematics education is a story of an organization locating its place and building consensus within the mathematics and mathematics education communities. In the next chapter, I look into this narrative using Foucault’s theoretical concept of the author function. This approach reveals some new insight about how Standards-based mathematics education has functioned as the cornerstone of K–12 mathematics education.
As I have examined the process of creating and sustaining the Standards movement in the previous chapters, one thing has become clear: there was nothing innocent about the project as a whole or any of its parts. This statement does not imply that there were ill intentions regarding the Standards documents. Rather, the Standards-based mathematics education did not emerge from a series of serendipitous events; there was intentionality behind creating the Standards and establishing them as “right” for mathematics education. Again, I do not blame NCTM for acting with intentionality; I would expect any organization that invested the time and resources that NCTM did in its efforts to operate in the same way. Nevertheless, it is important to consider the ramifications of creating these documents and establishing them as the foundation of a discourse. Forming the discourse of Standards-based mathematics education is neither good nor bad; it is dangerous in that it has the potential for harm. In this chapter, I make an argument for Standards-based mathematics as a discourse through the concept of authorship. I present my take on Foucault’s concept of the author function and use that concept to discuss three facets of authorship present in the Standards—the writers, the influences, and the 26th participant that is hidden in plain sight—and their contributions to the discursive formation of Standards-based mathematics education.

The Author Function

When thinking about how to refer to the narrators in this study, I encountered what seemed like a slight semantic challenge that turned into more of a theoretical issue that has come to shape this project. I was comfortable that these participants, along with
those that I was not able to interview, wrote the standards documents, but I was not sure if they authored them. Again, this may seem like a fruitless exercise in semantics, but, looking to Foucault (1979/1984b) prompted me to explore the issue further.

In his brief introduction to Foucault and his work, Gutting (2005a) surmises that an author cannot be considered simply as one who writes a text because text can be anything written; one who writes a grocery list or instructions for assembling shelves is not generally considered an author. In his essay “What is An Author?” Foucault establishes the phrase “author function” to address the difference between writing and authoring a text. The author function is a designation established outside of the writing of a text and outside of the text’s writer. It is through the author function that the author’s name is no longer referring to the person, but rather to “a certain mode of being of discourse” (Foucault, 1979/1984b, p. 107) that is formed based upon her or his body of work or oeuvre, a word that Foucault finds “as problematic as the status of the author’s individuality” (Foucault, 1979/1984b, p. 104). Foucault posits that the oeuvre is always incomplete because it privileges the inclusion of certain writings and

does not designate a text that [the writer] published himself under his own name, another that he presented under a pseudonym, another that might be discovered after his death in crude form, still another that is no more than scribbling, a notebook of jottings, a “paper,” in the same fashion. (Foucault, 1968/1994a, p. 304)

This process of assembling the oeuvre and designating the author function is “a complex operation which constructs a certain rational being that we call ‘author’” (Foucault, 1979/1984b, p. 110), resulting in the formation of a discourse around a name rather than a person. It is based on this attribution that we can refer to the “early Derrida” and “late Derrida” as two separate discourses authored, seemingly, by two different people. By
focusing on the discourse created around an author’s work, Foucault “[tries] to show that it is not the author who deserves our attention, but the discourse to which his statements belong” (Sluga, 1985, p. 405). According to the author function, the author’s role is “to fulfill a certain socially and culturally defined role in relation to the text” (Gutting, 2005a, p. 12). The author function, therefore, is a social construction (Gutting, 2005a) rather than a role automatically assigned based on relation to the text.

It is according to the author function that, in this study, I refer to Foucault in the present tense although he died in 1984. The Foucault that I use here is not Michel Foucault, the French philosopher and professor who was born in Portiers and spent time in the bath houses of San Francisco (Fillingham, 1993; Gutting, 2005a; 2005b). Instead, the Foucault that I use is the Foucault that has been created through the translating, compiling, editing, transcribing, and appropriation of his work and words. Through these processes, Foucault has taken on a new life through his author function that allows his ideas to live beyond his physical life as Foucaultian. This reincarnation of the author through his work is not unique to Foucault; the works of Marx, Freud, Freire, and many others have been codified into their own systems of thought in a way that their work continues to move and breathe. It is because of this author function that Foucault, the author, is not dead.

Other Considerations of Authorship

Although I appreciate Foucault’s author function, I find it insufficient based on my experience with academic publication, which has led me to other conceptions of authorship. Different academic disciplines handle authorship in different ways. A list of authors on an academic publication does not say much to the reader about whose ideas
reside within the pages. What about the people who influence academic publication but remain unnamed such as editors and reviewers? Are they also authors?

Gutting (2005a) summarizes Foucault’s distinction between the writer and the author in a single word: responsibility. He attempts to settle the debate about authorship by extending the idea beyond the production of text:

Such cases make it clear that being an author is not, as our simple definition assumed, just a matter of being the literal ‘cause’ (producer) of a certain kind of text. It is instead a matter of being judged responsible for the text. (p. 11)

In educational research discourse, for example, the first listed author is assigned the bulk of responsibility for the text and receives the majority of the credit for its publication. In the policy arena, however, authorship is less evident because the names of the contributors are often hidden behind the name of the organization such as NCTM. The author function, then, is assigned to the organization as the document shapes the organization’s actions and public image although the organization is not a being that can physically write. Considering Gutting’s perspective of authorship assigned to responsibility propels me into “rethinking my rethinking” (Stinson, 2004 p. xx) regarding who is an author, but I am not comfortable with limiting authorship to Foucault’s version of the author function. I wonder if those who sponsor or otherwise influence the text should also be considered as authoring that text. I present that argument through the lens of the Standards in the following sections.

The Writers as Authors

In the Bold Ventures study (McLeod et al., 1996), John Dossey outlined his desire to include seasoned voices in mathematics education in the CESSM writing group:
We wanted someone who understood the problems of change and past efforts, who had a vision at least back to the New Math times and knew why change hadn’t occurred, knew what the obstacles were. You need to have some people with “bleeding wounds” who understand change and the problems of change. We also wanted someone who knew research and technology; some people took more than one role. (p. 46)

After this quote, McLeod and colleagues observe, “as of late 1995, 11 out of the 34 (6 members of the Commission [on Standards for School Mathematics] and at least 5 writers) had retired” (p. 46). Thus, one of the criteria for inclusion in both the Commission and the Writing Group was a seasoned and well-respected career in mathematics education. This condition for participation spanned all of the Standards documents. Each writer had distinguished herself or himself in the field as a researcher, mathematician, mathematics educator, professional developer, teacher, mathematics supervisor, administrator, or some combination of these. Their names had weight and, understandably, NCTM wanted that weight behind its efforts. In other words, the writers themselves had acquired a sort of author function in their own right, which positioned them to be selected as contributors.

**A Big Family Tree**

In the oral history interviews, I asked each narrator who was part of a writing group how she or he came to be involved in the writing process. Each participant told a similar story of being involved in prior work on NCTM committees, knowing NCTM leaders through graduate school or professional affiliations, or holding leadership positions in other organizations such as the Mathematical Association of America or the American Mathematical Association of Two-Year Colleges. Few were able to pinpoint exactly how they were selected to participate, but it was clear that each road to
participation was paved with a variety of associations. Diane Briars described the writing
groups as “a big family tree.”

The leaders described very practical reasons for pulling writers from the “big
family tree.” Glenda Lappan, for example described the ability to construct ideas on
paper as a major factor for inclusion:

I can tell you that one of my priorities in trying to help put together the
teams was to make very certain that as least half the team had already
shown that they were good writers. You cannot do this work without
having people who can actually put the ideas that are being generated by
the group on paper. But I also put people on the groups that represented
the point of view from various levels of schooling. There was an
elementary teacher that served one of the groups. We had a middle school
teacher on our middle school writing group. We weren’t expecting and
we didn’t get an enormous amount of writing out of those people, but what
we got was terrific ideas and we got their critique of the ideas that we
were having. I think it was absolutely imperative that we had people like
that on all of our writing teams and some of them made enormous
contributions. They all made enormous contributions but some wrote
beautifully.

The “big family tree” made it easy to locate participants for the Working Groups,
but for the CESSM, it limited the document’s efficacy in certain circles. Skip Fennell
noted:

As you look at the teams of writers for the 1989 Curriculum and
Evaluation Standards they were basically all of our friends, by that I mean
they were all active NCTM members and probably in 100% of the cases
they were all mathematics educators.

NCTM attempted to alleviate some of the perception of nepotism with the PSSM.

Although it was difficult to balance a desire to bring diversity to the Writing Group with
an equal desire to include people who were dependable and up to the writing task, The
Commission on the Future of the Standards did attempt a more democratic process in the
PSSM.
Teachers as Authors

Most of the participants in the study were mathematics educators and mathematicians and were classified as such at the time of writing. Two of the participants, Angela Andrews and Sue Eddins, identified themselves as teachers at the time. Initially, I designated these two teachers (and their colleagues who were not participants) as exceptions to my application of the author function to the Standards writers, but a common thread caused me to reconsider: both Angela Andrews and Sue Eddins were awarded the Presidential Award for Excellence in Mathematics Teaching.\(^8^3\)

It is based upon this distinction that I ascribe the author function to the teachers in the writing groups. Angela Andrews described the access granted to her after receiving the award:

> You will find if you talk to enough other teachers who were on this committee that most of them were Presidential Award winners. That was what somebody called my credential; my union card. Once I won that everything opened for me.

Although most of them do not have a body of written work that bears their name, their teaching, as recognized by the Presidential Award committee, is the work that they authored.

\(^8^3\) The Presidential Award for Excellence in Mathematics Teaching [http://www.paemst.org](http://www.paemst.org) is a recognition reserved for teachers who have proven themselves to be national leaders in mathematics teaching. The award program began in 1983. Angela Andrews was the first kindergarten teacher to receive the award for K–6 mathematics in 1990 and Sue Eddins received it for 7–12 mathematics in 1989. Other Presidential Awardees involved with the Standards included Roberta Koss (PSTM; 7–12 mathematics; 1991), Tim Kanold (PSTM; 7–12 mathematics; 1986), Sue Ann McGraw (CESSM; 7–12 mathematics; 1983), Gail Burrill (PSSM; 7–12 mathematics; 1985), Carol Midgett (PSSM; K–6 mathematics; 1990), Jean Howard (PSSM; 7–12 mathematics; 1994), Mazie Jenkins (PSSM; K–6 mathematics; 1990), and Michael Koehler (PSSM; 7–12 mathematics; 1993).
The Externalities as Authors

McLeod and colleagues (1996) argue: “the authors were more concerned about mathematics and the internal forces that were driving change in mathematics education, rather than international competition or political forces from outside of mathematics education” (p. 38). Although I do not dispute this statement, I contend that those outside forces were present within and perhaps looming over the Working Groups, whether overtly or covertly. Their presence influenced NCTM and the writers in such a way that those influences also authored the documents by acting as both stimulants and restraints in the writing process.

Political Influences

Apple (1992) posits that education cannot be separated from the larger society:

Education does not exist isolated from larger society. Its means and ends, the daily events of curriculum, teaching, and evaluation in schools, all of this is connected to patterns of differential, economic, political, and cultural power. Efforts at reforming teaching and curricula—especially in such areas as mathematics— are also situated within larger relations. (p. 412)

As discussed in Chapter 4, political events were very influential in mathematics education throughout the 20th century, including during the Standards movement. In 1989, President George H. W. Bush convened U.S. governors—including Arkansas governor William (Bill) Clinton—for an education summit in Charlottesville, Virginia. At this meeting, the group agreed on setting national educational goals. They hoped that the agreed-upon goals could be achieved by 2000, thus the name America 2000. In his January 2000 State of the Union address, President Bush delivered an ultimatum: “By the year 2000, U.S. students must be first in the work in math and science achievement” (Long, 2003, p. 947). During his presidency, President Clinton expanded this work from
six to eight goals with the Goals 2000: Educate America Act (Lappan & Wanko, 2003). The fourth goal in Goals 2000 echoed the earlier president’s charge: “Mathematics and Science—U.S. students will be first in the world in mathematics and science achievement” (Lappan & Wanko, 2003, p. 917). The stage was set for continued reform efforts like the *Standards* that could promise progress toward that goal.

Along with the increased executive attention toward education reform came a reemergence of NSF as a willing funder of education projects. Although NSF would not fund the *Standards* efforts, after the CESSM it did sponsor several curriculum projects that were in line with the *Standards*. James Schultz thought that some of these projects took the *Standards* message too far, representing an unresolved debate in the Working Group:

> You had all of these curriculum projects supported by NSF and they went, in some cases I think, overboard. They just took the *Standards* to the extreme so that you could look through some of these curricula and you would look in an elementary book and never find anything that looked like basic facts or simple computation. Everything was in a context. We had discussions about this when we wrote the document. Some of the people said there should not be any sort of naked problems in the whole book so you never open up a page and see “What’s 536 plus 294?” You would never have that. You always had to have a context. And other people would say, “No, you still need that.”

These curricula represented the beginning of an increased NSF presence in NCTM’s projects. Although the agency did not fund the *Standards* directly, they did fund conferences and workshops that helped to get the message out.

**Mathematicians**

In the previous chapter, I discussed mathematicians’ involvement with and reactions to the *Standards*. I will not rehash those discussions here, but it is important to note that the voices of mathematicians—whether murmurs or roars, cheers or jeers—did
affect how the PSSM was written. Mathematicians were very critical of CESSM. They noticed a lot of mathematical inaccuracies and used them as a basis to discredit the document. Many were also upset that NCTM did not invite them to the table to plan or write the document. Several mathematicians began to use platforms such as Mathematically Correct to operate against Standards-based reform.

As a conciliatory gesture, NCTM revamped its writing strategy for PSSM to allow more input from mathematicians. The criticism that mathematicians gave before and during the writing shaped the document as NCTM tried to present something that was palatable to all. Alfred Manaster, himself a mathematician, recalled his personal desire to present a document free of errors:

One of the things that we really wanted to be careful of was to minimize the number of mathematical errors in this document so one of the things that I tried really hard to do was to look at all of the mathematics in the document to make sure that it was all correct.

In spite of efforts to build bridges with the mathematics community, the tension was still palpable for the PSSM writers.

Then we had that Mathematically Correct group that was going on while we were writing the Standards. That was the biggest tension around us, Mathematically Correct trying to tell us what we needed to do. They were the mathematicians, generally, and so that tension I think pushed us a little bit further to the left rather than to the right as they were. (Carol Malloy)

Based on Malloy’s statement, it is clear that the tension with Mathematically Correct did more harm than good to efforts to make amends.

Publishers

Authorship worked differently for publishers. Publishers functioned as consumers of the documents who translated them into curriculum materials. By producing the materials that the end users, teachers and students, would use to implement
the *Standards*, publishers functioned as authors of the *Standards* message. The *Standards* represented a significant financial opportunity for publishers (Apple, 1989) and for members of the writing groups. Shortly after the publication of each document, resource materials and programs hit the market with labels indicating that they were aligned with the NCTM standards (Ferrini-Mundy, 2000; Romberg, 1998). Publishers approached members of the writing groups to write textbooks and other curriculum resources. Angela Andrews described the prevalence of book contracts for *Standards* writers:

> They immediately started hiring people from the committee. If you didn’t get a textbook contract you weren’t paying attention. Many of us struggled mightily with that in that we didn’t think textbooks would do a good job. We had great doubts that they would actually listen to our input and use what we were saying but they were so very convincing when they met us and wined and dined us and said we really were going to have an impact….They were all hired by textbook companies, including me, but we were convinced that they were going to write the new textbooks anyway and maybe it would be a little bit better if we were on the writing teams. So we were hired with the best of intentions and then nothing that we said was ever used.

Romberg (1992) outlined the Working Group’s strategy “to create a demand for new products (text materials, software, tests, teacher preparation programs, and in-service programs)…[hoping that] the usual suppliers would, over time, prepare new materials to meet that demand” (p. 435). He later dismissed the publishers’ claims to alignment as “a marketing tool with little substance behind them” (Romberg, 1998, p. 17), reminiscent of the “superficial or cosmetic change laid over a substantially unchanged curriculum” (Gibney & Karns, 1979, p. 359) seen in response to New Math in the 1960s. Like Romberg, the narrators in the study were, at best, lukewarm about the textbooks made
available related to the Standards. They recalled that most of the change in textbooks was merely cosmetic.

A lot of the textbooks came out with their alignment charts, but it was more surface like “Oh yes! We do representations. Look! Here’s a chart. Look! We have a chart on page 89. There’s the representation standard.” So it’s more at that trivial level. (Gary Martin)

I think it was mostly token. I think they might have made a few changes. I think it’s mostly marketing because I don’t think the books have changed that much. That’s not true. Over time they made changes. There were certainly lots more problems in books because of the original ’89 Standards. I don’t know that the 2000 Standards made as big an impact as the ’89 did….You have to take all of that with a grain of salt. I think it’s mostly marketing but you always get a couple of books that really do try. They put together a different set of authors and write some stuff and I think some of those are pretty good. They often are not a big market share. (Sue Eddins)

The contradiction in Romberg’s statements combined with the narrator’s unimpressed response to most published materials may explain why these unendorsed materials have been the source of much of the controversy regarding the Standards (Ferrini-Mundy, 2000). Once the Standards were released to the public, they took on their own life via publishing houses where “it became virtually mandatory to claim that their books adhered to the NCTM standards despite the fact that some of the books were the same old thing with cosmetic changes” (Addington et al., 2000, p. 1073).

The proliferation of resources and professional development programs allowed publishers’ interpretations of the theoretical positions undergirding the Standards to permeate the culture of mathematics education. The textbooks became proxies for the Standards. James Schultz recalled:

What I noticed was a cosmetic approach. Buzz words. I think the textbooks did not respond for the most part. The commercial textbooks did not, for the most part, respond to the spirit of the standards. I think there were two camps here (and it would be interesting to see what other
people have to say about this) but I would say that commercial textbooks only pretended to be doing like the standards. In other words, they would have a very traditional lesson but they would have logos up and down the page saying, “Here’s technology! Here’s equity!” and they would plaster that stuff all over the book but the book didn’t really change all that much. They were still focusing very much on skills and shallow level problem solving not multi-step problems and so on. And that was what teachers had to use…. We found, within one or two years, people were saying “Oh these standards aren’t working” but it was the books that didn’t work.

In the eyes of the public that did not read the *Standards* themselves, the quality of these resources reflected directly on the *Standards*.

**Absent Voices**

When considering the external influences that had a hand in authoring the *Standards*, there are some groups that stand out, such as mathematicians and political influences. There are also some voices that are conspicuously absent, such as parents (Price, 1996). The only mention of parent representation in the data came from Cathy Seeley:

> There was a project initiated by the Association of State Supervisors of Mathematics…in the wake of the ’89 standards that was called “Leading Math Into the 21st Century.”…They convened regional meetings around the country….And each state got to send a team of people that included a lot of non-math people like superintendent type people and policy makers and PTA-type people.

In the efforts to open up the *PSSM* to diverse perspectives, there is no mention of including parents by, for example, extending an invitation to the National Parent Teacher Association to form an ARG.

From her position as NCTM president during *PSSM*’s early stages (1996–1998), Gail Burrill (1997) argued that many parents were not convinced that a change in the approach to school mathematics was necessary because “the mathematics they learned (and often disliked or did not understand) is what they want[ed] for their children—it
‘worked’ for them” (p. 337). Burrill continued to describe NCTM’s responsibility as “demonstrating why the mathematics of yesterday is not right for tomorrow” (p. 337). As a gesture toward community involvement, she argued that parents should be “informed of what children would learn” (p. 337). Compare these statements to one about mathematicians: “Clearly, to have a conversation about mathematics, mathematicians must be at the table” (p. 337). Might a similar argument be relevant for parents that to have a conversation about children, parents must be at the table? Were parents to be told while mathematicians to be talked with?

Another missing voice in the Standards is business. According to Glenda Lappan, the business community was invited to participate in the PSSM process:

We actually invited [them]. We had some meetings at which we invited some people from the business community. I cannot say that they had the kind of influence on the document that the mathematicians had on the document, but we did try at some of our DC meetings to have some business people that were involved in that. I can’t say that that was much of a success to be perfectly honest, but we did try…. I think we were less successful with the business community than we would have wanted to be.

The data did not provide a reason for the business community’s lack of involvement in the Standards process. One reason could be that Achieve, an organization founded by a group of governors and business leaders at the 1996 National Education Summit, was simultaneously active and pursuing a different educational agenda.84

The 26th Participant: NCTM as Author

Throughout this study, I acknowledged a participant that was hidden in plain sight, hovering over the data. This participant, NCTM, was present long before the first interview and is the most obvious possessor of the author function related to the

84 Achieve (http://www.achieve.org/), along with the Council of Chief State School Officers, has led the Common Core State Standards effort.
Standards, creating an anthropomorphic quandary. As an organization, NCTM cannot pick up a pen, yet it wrote. It cannot think, yet it created. It cannot speak, yet it said. It cannot make decisions, yet it assumed responsibility. As a community interested in mathematics education, we have assigned these human actions to an organization that, in turn, has assumed responsibility for a set of documents, a movement, and a discourse.

Bossé (2007) presents two factors that render the analysis of organizational documents problematic:

First, care must be taken to avoid personifying an organization and equating one viewpoint to many individuals. Organizational documents are generally written by committees; thus they, at best, represent the opinions of the writing teams rather than the organization as a whole, and may or may not adequately mirror the opinions of the entire organization, if such unified opinions exist. Second, organizational documents written over a period of decades may very well have been composed by far different writing groups. Therefore, beliefs of different writing teams may not be consistent. Nevertheless, with these concerns in mind, some degree of organizational and historic consistency must be necessarily assumed. (p. 2)

Although I agree with Bossé’s stance regarding the complexity of organizational documents, Foucault’s author function allows me to personify the organization based upon two conditions. First, NCTM’s organizational structure requires layers of approval for such documents. The NCTM Board must accept the positions presented in any document presented as an official position of NCTM. According to Lee Stiff, “Actually when all that’s said and done the [Executive] Board reviews the document and accepts it or doesn’t accept it.” Second, NCTM claims the Standards its own, as do those of us that consume them; the writers are an afterthought at best. This statement does not negate the importance of the writers, but it does highlight the fact that we refer to the Standards as belonging to NCTM rather than any particular writer or leader.
NCTM as Political Organization

In many ways, the story of NCTM as a creator of discourse relies on understanding NCTM as a political organization. In its brief existence, NCTM has been through many changes. It has become “a recognized leader and a driving force in mathematics education” (Gates, 2003, p. 750), but those changes did not happen overnight. The organization began to establish its influence when it provided “the clearest and most forceful attempt as persuasion” (Garrett & Davis, 2003, p. 510) in support of mathematics education after World War II. In the reports of the NCTM Commission on Post-War Plans (Commission on Post-War Plans of the NCTM, 1944; 1945; 1947), NCTM “provided a wake-up call about the need for greater attention to mathematical content in school mathematics” (Gates, 2003, p. 740). The commission proposed a three-track mathematics program as a compromise with the progressives: a rigorous college-preparatory track, a track for students entering industry, and “a completely new approach to the problem of the so called slow learning student” (Commission on Post-War Plans of the NCTM, 1944, p. 230). According to Gates (2003), the recommendations of this report did not go beyond conversation.

In 1950, NCTM moved to Washington, DC to become a subject-matter department—and tenant—of the NEA (Gates, 2003). The association with the NEA lasted through the 1960s but NCTM sought its own space as the NEA “became more like a union in its activities” (Gates, 2003, p. 739). In 1973 NCTM dedicated its new headquarters in Reston, Virginia. The affiliate relationship with the NEA officially ended in 1975 (Gates, 2003).

85 NCTM’s relationship with NEA is another area for further investigation.
NCTM took a turn as an organization in 1966 when the Board of Directors passed a measure that would allow them to take a more active stance in the professional community. According to Gates (2003):

In 1966, the NCTM Board of Directors approved a policy under which it would be more willing to take a stand on controversial professionally related topics and could do so when such opinions and ideas were not unanimous. It was a bold new step for the Council, to take actions that were more visible in the public sector, leading to the development and distribution of position statements, the publication of guidelines and standards, and testimony before congressional committees. (p. 749)

This resolution allowed NCTM to make its own position statements as well as joint statements with other organizations such as the Mathematical Association of America (MAA). Despite several position statements published after the 1966 policy, An Agenda for Action (NCTM, 1980) was the first significant political move (Lindquist, 2003).

As NCTM moved into the Standards movement, the organization also experienced a political surge. The NCTM presidents that I interviewed—John Dossey, Glenda Lappan, Lee Stiff, Cathy Seeley, and Skip Fennell—all spoke of varying degrees of political involvement during their terms, but Glenda Lappan’s comments were particularly telling of the intentionality of NCTM’s political presence. She recalled that one of her goals for her presidency was to increase NCTM’s presence on “the Washington scene”:

That was one of the things I worked hard on when I was president. I wanted the people within the beltway actually to be aware of NCTM and aware of what we were trying to accomplish. I happened to have some friends who were in high places within the federal government who were willing to listen to us and they got on board and were very much instrumental in helping us spread the word about the document….We became and were a very strong part of all the conversation that went on

---

86 Diane Briars was elected NCTM president in late 2012 after our interview. Her term as president will begin in 2014.
around the mathematics and mathematics education communities in the DC area during the time that we were doing this document work.

Skip Fennell described his activities in Washington:

I live outside of Baltimore and when I was president—partly I think because of where I live geographically and partly because of prior experiences—I was in front of Congress five or six times. I was meeting with senators, meeting with people from the House.

I presented Skip Fennell with a hypothesis that NCTM shifted from a teacher organization to a political organization. He responded:

When we were on the Board you never spent time talking about mathematics, we were seemingly always talking about policy. That’s a policy job. When you get elected to the NCTM Board of Directors most of your meetings are about policies related to the subject. You’re not going to have discussion about what are really cool ways to teach division of fractions. That discussion is never going to occur at a Board meeting but you will have discussions about the thrust of the annual meeting or what are the real elements that we really need to be highlighting in messages from the president….You’re right—it’s a good catch on your part—that NCTM has grown from a group that may have sat around and talked about what 7th graders should do and teaching fractions, etc. to being much more about the policy around the subject…. I say to everybody that the job of the NCTM president is in Washington, DC. It’s all about policy surrounding your subject. I think that we’re in a policy-related world and any professional society really has to pay attention to that. It’s taken NCTM a really long time to do that.

As a function of this political responsibility, its leaders—the President and Board of Directors—must undergo training to be prepared to represent the organization. Fennell continued to describe the training required to carry the organization’s message.

I used to joke with people that they put me (and not only me but the presidents that you’ve talked to in this project of yours) through media training and I’ve always said I failed media training at least three times because people would say things to me and I would want to say to them “That is such bullshit!” and you can’t say that. So notions around what is your message and what’s important to you as a field and so forth are really important. Maybe that will get you additional money from the United State Department of Education or get you additional support from the
National Science Foundation or get your association out there in terms of the media in a positive way. That’s what you have to do as well.

As NCTM has changed, so has its political volume. The organization has been able to leverage its political connections in favor of its approach to school mathematics, Standards-based mathematics education.

**Standards-based Mathematics Education as Discourse**

NCTM’s increased political stature is directly related to the establishment of the discourse of Standards-based mathematics education. In the Standards documents, NCTM created a means by which school mathematics could be understood. Through its political position, NCTM has solidified the Standards documents as the basis on which school mathematics has come to be understood and performed, Standards-based mathematics education. Recalling Foucault’s concepts of discourse and power/knowledge from Chapter 2, discourses exist in spaces where certain knowledge statements become possible, thereby rendering others impossible. Power maintains discourse by enacting the rules of exclusion that govern these possibilities. Strategy is instrumental in the process of establishing discourse. It is through strategy, therefore, that I make the argument that Standards-based mathematics has functioned as a discourse.

I must begin this argument by stating that I am suggesting that NCTM created the Standards as part of a scheme to take over mathematics education. I believe that this process began as a means of allowing mathematics educators to become the voice of mathematics education. I neither assert that the sole purpose for creating this discourse was the elevation or preservation of NCTM as an organization or any affiliated person or group of people, nor that the discourse of Standards-based mathematics education has
formed in the way that the NCTM leadership may have intended. Nevertheless, my suggestion that the NCTM leadership did intend to create a discourse is not controversial. Romberg (1998) wrote:

The vision of what mathematics students should have an opportunity to learn, how mathematics should be taught in classrooms, and how students and programs should be assessed and evaluated has been described in three documents prepared by NCTM: Curriculum and Evaluation Standards for School Mathematics (1989), Professional Standards for Teaching Mathematics (1991), and Assessment Standards for School Mathematics (1995).

Although he may disagree with the language, it appears that Romberg is describing a discourse of school mathematics based upon the Standards in which what “should be” included on all fronts is clearly defined.

NCTM has been the leading voice of mathematics teachers and mathematics educators since its founding in 1920. NCTM’s research journal, Journal for Research in Mathematics Education, first published in 1970 upon recommendation of the RAC, has been the flagship research journal in U.S. mathematics education and a leading journal internationally (Johnson, Romberg, & Scandura, 1994; Parks & Schmeichel, 2012).87 The practitioner publications—The Arithmetic Teacher, Mathematics Teaching in the Middle School, and The Mathematics Teacher—provide current information and instructional ideas for teachers that are not available elsewhere. Through these publications and its national, regional, and state meetings, NCTM has created a platform from which it has been able to direct the conversation within mathematics education for many years.

87 A search of the website Journal-Ranking.com (http://www.journal-ranking.com) revealed that the Journal for Research in Mathematics Education ranks 8th among academic journals related to education. It is the second highest ranked content-specific journal (Reading Research Quarterly is ranked 6th).
NCTM used its organizational structure and assets, along with political positioning and media, to craft and promote its *Standards* as the guiding documents not only for the organization but also for school mathematics writ large. In several ways, the NCTM managed what I was able to know about the process by

- Not maintaining archives of primary data that are available to the public or to dues-paying members;
- Publishing the only extended histories of mathematics education with the exception of the *Bold Ventures* study; and
- Publishing the majority of literature available related to the *Standards*.

These observations may seem like an exercise in finger pointing, but these mechanisms of discourse management help to make my case rather than work against it. NCTM has done what any organization would do: they have protected their investment in the *Standards* process by constructing a discourse around the process whereby the stories told about the *Standards* must be told, in large part, from NCTM’s vantage point.

Additional evidence of the care that NCTM took in crafting *Standards*-based mathematics education is in Apple’s (1992) description of the *Standards* as a slogan system based on three criteria. First, the *Standards* were vague enough to create an umbrella large enough to cover those who may disagree with the message. Although critics may have taken exception to elements of the *Standards*, they could not disagree with everything. Openly challenging messages such as “Mathematics for all” would create a reputation-scarring backlash. Second, the *Standards* were specific enough to give the audience something tangible in the moment. The examples and vignettes in the documents, combined with coordinating publications and professional development opportunities, allowed practitioners to quickly tap into the documents and their message.

88 I define *discourse management* later in this section.
The final characteristic of the *Standards* as a slogan system was their charming quality. They provided a call to action that inspired the mathematics education community to sustained action.

Apple’s presentation of the *Standards* as a slogan system is compatible with my discussion of *Standards*-based mathematics education as a discourse. The discursive representation addresses the limits that maintained the discourse while the slogan system described the strategy for maintaining the discourse. The slogan system sustained the discourse by making it relevant and accessible to a variety of audiences. Even the harshest critics must acknowledge agreement with something proposed in the *Standards*.

**What were the *Standards* supposed to be?** There were inconsistencies among participants regarding how NCTM intended for the *Standards* to be used. Alan Schoenfeld, for example, described the *CESSM, PSTM*, and *ASSM* as a set of internal documents whose reach went far beyond what was expected. Glenda Lappan described the *Standards* as “some documents that would help the school community across the nation get together on a set of ideas that could raise the standards for what was happening for kids.” Gary Martin described the *PSSM* as a rallying point that provided a sense of direction for school mathematics:

I don’t think there was any sense that [the *PSSM* were] standards that [were] going to be implemented. It was more of “This is where we’re shooting.” It’s like being the standard bearer in the old middle ages army or the guy with the flag in the Civil War and we’re all gonna rally around the flag.

**Standards as curriculum?** Nearly all of the narrators in this study stated that the purpose of the NCTM documents was to establish guidelines for what high quality mathematics curricula, teaching, and assessment should look like. Diane Briars spoke of
the initial discussions in the writing of the 1989 *Curriculum and Evaluation Standards for School Mathematics*:

I will never forget the first night we were all there. We were sitting around and the question was “Why are we writing standards and not writing a curriculum document or a curriculum framework?” and the answer was [that] politically it wasn’t possible to write a curriculum document because education is the purview of the states and the best that NCTM could do would be to write standards. The whole idea was that a standard was a description of quality, so what would a quality curriculum look like? A quality curriculum would have these particular standards of excellence or quality, so that’s how we were thinking about it.

Given this implied acknowledgement within NCTM that the organization had no power to set state curricula, they utilized the only power that they had: the power of influence. Through elaborate political and public relations strategies and the production of its own instructional resources, NCTM exercised its power of influence to create an environment in which the *Standards* became the basis for many states’ mathematics curricula. In other words, they created a discourse: *Standards*-based mathematics education.

Despite its influence, NCTM contended throughout the *Standards*-making process that it was not engaged in making curriculum. Participants offered several reasons why the *Standards* were not curriculum. Lee Stiff argued that the *Standards* were a blueprint that allowed states the interpretive latitude to make their own curricular decisions:

You gotta remember the ’89 standards provided a blueprint and didn’t really provide that details. So each state interpreted the ’89 standards slightly differently. We’re always struck by, say, the difference between what was going on in Texas and what was going on in North Carolina. There were differences in how they interpreted what was going on in the standards. It’s a lot like when people talk about the Bible and how people interpret what’s in there. Their own perspectives have them translate what is written. That’s what happened with the standards and it continues to happen, I think, in great degree. Unless you give very specific details about what you want to be in the curriculum then people are left to sort of
interpret what the meaning of things are on their own and that was by design.

In his next sentence, Stiff says that all curricula offer the flexibility that the Standards provided.

Almost all curricula are like that. They sort of leave some flexibility for people to read into [it] what was intended. So when you say you want kids to do problem solving and you give some examples of that still people can sort of refashion what you meant by the way they see it. So that always happens and probably it happens by design. So neither of the standards—the ’89 or the 2000—was written so that you were not left to have your own interpretation. They both allowed the users of the standards to have their own interpretation of what was meant.

Stiff’s statements revealed a fine and potentially permeable line between the Standards and curriculum. Perhaps the distinguishing factor is jurisdictional: professional organizations such as NCTM can only make recommendations while policy-making bodies such as state departments of education can make curricula. This fuzzy area of understanding if the Standards are curriculum and if the NCTM is in the position to make curricular decisions can link back to an equally fuzzy understanding of what curriculum is.

There are many studies that address curricular content and many scholars who “write books, take courses, share views, and engage in disagreements about what curriculum is and should be” (Null, 2011, p. 6). Few, however, closely examine how curriculum is developed and how curriculum is shaped through social, political, professional, and economic influence. Moreover, few practitioners, including curriculum specialists (Null, 2011), understand curriculum as more than a state document. This lack of understanding is, at least partially, grounded in varied meaning of the term curriculum.
Sherin and Drake (2009) offer three common definitions of curriculum as used in the United States:

First, a curriculum can be thought of as the set of written materials provided to teachers—the textbook, teachers’ guide, assessment materials, etc. In addition, the term curriculum is used to refer to the lesson that is enacted in the classroom. Finally, for many teachers in the US a curriculum also exists in the form of district- or state-level learning objectives for students. (p. 468)

The *Standards* as a set of learning objectives align with this conceptualization of curriculum.

Null (2011) defines curriculum more broadly as “a specific, tangible subject that is always tied to decision making within institutions, whether they are schools, churches, nonprofit agencies, or governmental programs…[and] requires those who discuss it to address what subject matter should be [emphasis added] taught” (p. 1, emphasis added). He continues to describe curriculum as “a social force [requiring] those who make curriculum decisions to address questions of teleology, ethics, and local circumstances” (Null, 2011, p. 7). Null’s description of curriculum as a social force aligns with the idea of *Standards*-based mathematics education as a discourse that describes what should be taught, how it should be taught or what school mathematics should be. NCTM uses *should* throughout the *Standards* documents. In the *PSSM*, for example, each grade level content standard begins with “In grades X–X, all students should.” In the grade level process standards, the headers read “What should communication look like in grade X through X?” and “What should be the teacher’s role in developing communication in grades X–X?” Although it remains unclear from the language if the *Standards* were themselves curricula, it is clear that they were a social force formed to drive mathematics education.
Managing discourse through sponsorship. The NCTM leadership had a message that it wanted to deliver through the Standards documents and made personnel and editorial decisions accordingly. These measures were a form of discourse management. Discourse management, as I define it, is a mechanism of preservation. It is a process of making decisions that form and reform a discourse in a way that keeps it viable and prominent. It is a step beyond keeping up with the pulse of the discipline; it also entails changing the pulse when necessary to redirect it to the desired discourse.

The leadership structure also assumes this authority based upon its role as financier of the standards documents. Aside from a small ($25,000) grant from the AT&T Foundation (McLeod, 2003) to begin the work of the Curriculum and Evaluation Standards, NCTM financed this initial standards effort. As an organization financed chiefly through membership fees, the NCTM was unable to fund the full budget of the Curriculum and Evaluation Standards, but, in the end, they boasted that the Curriculum and Evaluation Standards were “developed and distributed almost entirely with membership funds” (Crosswhite et al., 1989, p. 56). McLeod (2003) asserts:

The lack of outside funding allowed NCTM an independence that other curriculum areas did not always have. Although other curriculum areas received up to $3 million in federal grants to develop standards, most NCTM leaders were pleased that they did not have to follow federal agency guidelines for such a project. (p. 772)

In his interview, Lee Stiff echoed this point of pride: “Unlike everyone else who created standards at this time who had federal government money to help them do that, the council paid for the creation of the standards document out of its own budget, which was millions of dollars.” In support of this statement, McLeod (2003) places the cost for
producing the *Curriculum and Evaluation Standards for School Mathematics* at approximately $1 million.

**Managing discourse through oversight.** The chief means of discourse management in the *Standards* movement was the selection of writers. Lee Stiff, NCTM president from 2000 to 2002, commented:

> You have to remember in the guise of a democracy what that means [is] the people who were in charge didn’t make themselves in charge…. The [NCTM] Board [of Directors] picked those people and the Board would know who those people are and what their perspectives are. So that when I pick you, say, to be in charge of the writing team for measurement I know who you are. I know what you’ve written in the past. I know what your perspective is. You’re not the only one who could have been the head. So the Board with the president has to decide who does what. So, in that context, yes the Board and the president has decided what’s important and what’s gonna get written because they already kind of know what these people will write….I believe in a very real sense the Board orchestrated this. These people didn’t get to be the writing leaders because they asked to be the writing leaders. They got to be the writing leaders because the Board picked them and the Board just didn’t put their names in a hat a and pull them out. The Board gave thought to who should do what. The Board gave thought to who should be on the committee. So in that sense the Board is creating the document in its own vision. It’s just not writing the words. In reality, when people get together things change and the dynamics will have outcomes that you may not have fully expected but in broad terms it’s exactly what the Board and the president foresaw because they picked the people.

Stiff’s comments suggest a sort of secondary authorship assumed by the NCTM Board of Directors and president as commissioners of the standards documents and conveners of the writing groups.

Olson and Berk (2001) posit that “[the *Standards* represent] the collective best thinking of the mathematics education community” (p. 306). Burrill (1997) argued that the *Standards* provided a framework to “ensure that discipline experts have a voice in helping states and districts make interpretations” (p. 335). As I juxtapose these assertions
with Lee Stiff’s position that NCTM chose writers who had demonstrated that they would craft the Standards documents in alignment with NCTM’s goals, I wonder if the Standards truly represent the community’s best thinking or the best thinking that aligned with the organization’s strategic plan. Did the writers represent all the expertise of the discipline of mathematics education or the segments of that expertise that aligned with NCTM’s priorities? With all due respect to the writers, I wonder about the voices that were absent from the Standards writing conversations that also represent “the best thinking of the mathematics education community.” NCTM had a position that it wanted to advocate through the Standards and establish as mainstream within mathematics education. Lee Stiff’s comments in the preceding paragraph demonstrate that the organization selected writers who were great minds that would legitimize the work. The threshold of variation from the message that NCTM wanted to bring to market was slim. Other great thinkers within mathematics education may have challenged the message and thwarted the organization’s mission.

In each of the Standards documents, NCTM exercised its ability to construct the document and the conditions of its public presentation. As NCTM changed as an organization over the years, so did its position with respect to the documents and their writers. Mary Lindquist (2003) wrote of increased oversight from NCTM with each document.

As support grew in each effort, so did interest and expectations. Within NCTM, the first document was left to the writers and the Commission on Standards. Although there was more interest after the review of the draft, the NCTM Board of Directors seemed content to let the process proceed as planned. For the second document, all members of the commission were on the NCTM Board, including the two presidents who served during this two-year period, a Board liaison, the chair of the writers, and the executive director. The Board was involved in approving positions taken
in the document….By the third document, the Board believed it needed to take an even more active role. This change occurred in part because there was no commission appointed as a buffer, but I think it was also the result of the increased knowledge of the importance of standards and the overall changing environment around standards from a supportive one to a questioning one….The different NCTM Boards during the five-year period of planning and developing *Principles and Standards for School Mathematics* (NCTM 2000) were much more involved in the process than previous Boards had been. They were no longer content, as the Boards had been during the development of the first document, to react to a draft just as other NCTM members did and then to wait for the final version. Ironically, however, when the writers of the fourth document asked the Board for advice on difficult issues such as tracking and request decisions on electronic issues, few responses were forthcoming. Instead, some Board members simply wanted to be sure that their individual views were heard about issues of concern to them. (pp. 830–831)

I began this tripartite discussion of authorship with the author function of the writers because I do recognize each writer as an independent, complex, and respected thinker. Through my discussion of the organization’s efforts to manage the discourse, it is not my intent to diminish the writers by suggesting that they were puppets of NCTM. Rather, I highlight the complex relational dynamics between an organization that commissions and directs a work and those volunteers whom it chooses to construct and represent that work. The writers’ author function worked in their favor by allowing them access to the opportunity, but it also worked in NCTM’s favor. Their names and affiliations added credibility to a document that, if written by different people who worked in different spaces, may not have gained the same stature.

An example of the politics of credibility in the *Standards* is the case of Nel Noddings. Noddings is best known for her work in feminist ethics and care; few know of her background as a mathematics educator. She participated in the *ASSM* as a member of the resource group. Her name—along with others such as Rep. Annette Morgan, whose presence may have indicated consultation with and support from the political arena—was
more of a contribution to the ASSM than her input. Immediately prior to working with the ASSM, Noddings published an article entitled “Does Everybody Count? Reflections on Reforms in School Mathematics” in which she questioned the idea of Mathematics for All as popularized through the CESSM (Noddings, 1994). She stated in the interview that her efforts to problematize NCTM’s rhetoric regarding equity in assessment in this article and other forums garnered a lot of reaction but “didn’t seem to change people’s minds every much.” It is most likely that Nodding’s questions kept her off of the ASSM writing group because she was questioning the universal need for mathematics instruction and, by extension, for mathematics education standards. However, adding her as a part of the Resource Group—a group of advisors and commentators in the process whose role was unclear to most of the narrators in this study—allowed her to register her concerns in a controlled way and allowed NCTM to advertise that she was part of the Standards-making process.

**Managing discourse through publication.** Shortly after the CESSM, it became an unspoken obligation for those who wrote for NCTM publications to nod to the Standards documents and to show a link between their ideas and those values espoused therein. Gerald Rising, a writer for the CESSM, named this issue as a negative consequence of the Standards:

> I think the major influence that I see of the Standards has been that the NCTM journals have been extremely strongly affected by them....If you write an article for [an NCTM] journal the first question they ask it “Does this fit the Standards?” I think that’s wrong. Once again it’s saying, “Look, if you’re doing anything that’s different from the Standards, forget it.”

It is evident from Rising’s comments that he perceived the Standards to be the arbiter of what is (im)possible for publication within mathematics education. A glance through
more recent NCTM journals reveals that Rising’s sentiments still ring true (although the referent is increasingly shifting to the CCSS-M). In fact, the Standards became more than an obligatory reference; they have defined a movement of Standards-based mathematics education in which anything that has been thought, spoken, or acted upon must line up with the Standards’ perspective in order to be considered true or valid (Parks, 2009).

Here, Foucault’s power/knowledge is apparent. NCTM’s role as publisher of one of the leading mathematics education research journals makes it the gatekeeper for knowledge dissemination in mathematics education. Through this venue, the organization “influences the direction of mathematics education research” (Langrall, Martin, Ellerton, Hertel, & Fain, 2013, p. 338). Although the Journal for Research in Mathematics Education has a rotating Editorial Board, the NCTM imprint is a signal that the organization maintains the controlling interest. Therefore, NCTM controls, in large part, knowledge production in mathematics education.

Throughout the Standards movement, the NCTM practitioner journals—Teaching Children Mathematics, Mathematics Teaching in the Middle School, and Mathematics Teacher—have functioned as supplementary instructional materials (Seymour & Davidson, 2003). In addition, NCTM has maintained a viable publishing arm that publishes books that support the Standards agenda. In her written reflection of the time, Mary Lindquist (2003) recalls:

The Curriculum and Evaluation Standards also provided impetus for other publications of NCTM. The publications department, which was almost on the verge of being eliminated in 1983, soon became the main source of revenue for the Council. NCTM had planned for support materials to exemplify the Standards. Initially, there was discussion that these materials should be appendixes of the Curriculum and Evaluation
Standards. When it became evident that this was not feasible, the Addenda Project was initiated. This project produced twenty-two grade-level or topic booklets with activities and commentary related to the Standards. (pp. 837–838)

This Addenda series was published between 1991 and 1995 “to fill in gaps and add pedagogical specificity and detail to the curricular recommendations contained in the three primary documents [CESSM, PSTM, and ASSM]” (Bossé, 2007, p. 4).

Recognizing that the Standards could provide a financial boost to the organization in addition to the other benefits of their publication, NCTM continued to use its press to produce materials in support of the Standards agenda. After the PSSM, NCTM released the Navigations series, a series of books containing classroom activities that aligned with the PSSM. Some of the most significant NCTM publications outside of the Standards came in 2009 when, under Skip Fennell’s leadership, the Board approved publication of the Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics. With the Focal Points, NCTM broke down the PSSM’s grade bands into grade level expectations.

It wasn’t until the Focal Points that we decided to go grade-by-grade rather than in grade bands. A grade band curriculum is not helpful if you’re a fourth grade teacher…. A lot of people don’t know this but we had to move quickly with Focal Points. I’ll take the hit on that because some people said we should have had it out for a year for comments. If we would have done that then Achieve would have had something out. We would have lost an opportunity. So frankly I felt it was important to be out first publication-wise…. You want to be lead dog. You want to be in charge. None of these sets of Standards have ever been perfect and they never will be because you will always lose sight of something or miss something but you want to hear people say, “Oh NCTM did this? That’s a pretty good idea!” (Skip Fennell)

89 http://www.nctm.org/standards/content.aspx?id=270
NCTM’s in-house publishing capabilities made it possible to “move quickly with the *Focal Points*.” They were able to produce a publisher grade product and make it available online and in print in very little time, maintaining their position as “lead dog.” Fennell went on to say that the *Focal Points* “set the table for the Common Core [State Standards].” As the Council of Chief State School Officers took the lead in bringing forth the CCSS in the late 2000s, NCTM was no longer in control of the message of what mathematics education in the United States should look like. Although it remains to be seen, it seems that CCSS is a movement where NCTM has lost its leading position, signaling the close of a phase of the *Standards* movement.

**An example to consider.** The ideas of the *Standards* documents as monuments and *Standards*-based mathematics education as a discourse seem innocent enough; they were produced by some of the most influential people in the field who were assembled by the flagship organization of mathematics teachers and mathematics educators. The *Standards* were vetted and revisited over time. The problem with a monument, however, is that it stands as a symbol often without critique.

To illustrate the insidious way in which the *Standards* have become a discourse, I use Perrin’s (2012) study of seventh and eighth grade teachers’ awareness of the *CESSM* and *PSSM* and their agreement with “NCTM’s vision of school mathematics as expressed in these documents” (p. 466). In this study, Perrin considers the correlation between a teacher’s level of certification (i.e., elementary, secondary) and her or his belief in what Perrin calls “NCTM-based” or “NCTM-oriented” principles, which I have termed *Standards*-based mathematics education. The survey instrument included in the article’s
appendix does not mention NCTM at all; all of the Likert items represent elements of the Standards without explicit mention of the organization or the documents. He found that secondary-certified teachers aligned themselves more with the Standards than their elementary colleagues.

I use this study as an exemplar of mathematics education research that treats the Standards as monuments for four key reasons. First, the study is acceptable and typical. I use these terms not to disparage Perrin’s (2012) work, but rather as a nod to recent debates within mathematics education research and education research writ large about the type of research that gatekeepers consider scientifically based, appropriate, and beneficial to the profession. Perrin’s study is a quantitative study focused specifically on mathematics education and not issues that some would perceive to be peripheral. Second, the study was published in School Science and Mathematics, a reputable academic journal in mathematics education. The third reason for selecting this study was that the author was not a part of any of the Standards Working Groups. Finally, the study’s date of publication is 2012. The CESSM and PSSM are now 24 and 12 years old, respectively. This study represents an approach to the Standards after the honeymoon period, when sober and more reflective minds should prevail.

While I do not critique Perrin’s (2012) methods, I am troubled by the broad assumptions that he makes without problematizing the Standards. He writes:

    Although it is understandable that teachers who took the time to read one of the NCTM’s standards documents thoroughly would have relatively strong beliefs in NCTM’s vision of school mathematics [Is it?], this might

---

90 Van Cleave (2012) conducted a genealogy of Scientifically-Based Research in education. For discussions of what qualifies as appropriate and beneficial research in mathematics education, see Heid (2010); Martin, Gholson, and Leonard (2010); Confrey (2010); and Battista (2010).
also be expected, perhaps to a slightly lesser degree, by teachers who read sections of either Standards or PSSM. (p. 472)

I inserted a question right at my point of question in my initial reading. The question represents my issue with what I read as Perrin’s assumption that the Standards are “right” and anyone who takes the time to read them will realize that. He later exposes the same assumption by suggesting that the Standards documents should be an essential part of a comprehensive professional development or preservice education program so that “[teachers] can see that NCTM-based practices work and learn how to put these strategies into their own classrooms” (p. 473). By operating from an unspoken (and perhaps unconsidered) assumption that the Standards are right for mathematics education, Perrin reifies the discourse if Standards-based mathematics education by neglecting to problematize NCTM’s vision for school mathematics.91

Summary and Conclusion

Foucault’s author function provides a perspective of authorship that is larger than the act of writing. In this context, authorship becomes an issue of power and responsibility. In the case of the Standards writers, each possessed the author function in some way, placing the notoriety that each singular author possessed as a condition of participation. The author function makes visible the different layers of authorship that apply to documents such as the Standards, but the author function remains insufficient.

91 Perrin’s study is not the only example of such assumptions. See, for example, Futch and Stephens (1997), Graham and Fennell (2001), Taylor (2002), and Wiersma and Weinstein (2001). Some of these studies do indicate disagreement with elements of the Standards, but none of them question if the Standards represent the appropriate direction for school mathematics. In each study, the writers operate from the position that the Standards are “right” and we must align with them.
Zooming out once again on the idea of authorship, it becomes apparent that external influences can also author. In the case of the *Standards*, there were outside voices that influenced the writing. This influence was most evident with the *PSSM*. NCTM made decisions about the *PSSM* writing process based on the response to the prior documents from mathematicians and the political realm. Additionally, textbook publishers, as consumers of the documents, functioned as authors. They conveyed the message of *Standards*-based mathematics education to the public by claiming that their materials were aligned with the documents. The veracity of that alignment was immaterial; for many end users—teachers, students, and parents—the textbooks were their only connection to the *Standards* and if the books failed, the *Standards* also failed.

Although the writers and externalities contributed to both writing and authoring the *Standards*, NCTM was the ubiquitous possessor of the author function. The organization claimed responsibility for the *Standards* and set a variety of discourse management strategies in motion to ensure that *Standards*-based mathematics education was the discourse for mathematics education for many years, but none of its actions were beyond understanding. It is reasonable for an organization that invested such time and resources into a project to take measures to ensure that the project maintains relevance and viability within the professional community. Nevertheless, taking such measures without problematizing them is dangerous (Foucault, 1983).
CHAPTER 7

RECAPITULATION AND CONCLUSION

As a teacher, I found myself unwittingly subjected to a set of expectations that I did not understand and those around me were unable to articulate. In my quest to apprehend these expectations, I discovered that they were based on something much larger than the whims of a district mathematics coordinator. There was something larger at work, namely a discourse that I call Standards-based mathematics education that was based on a set of documents that I had never seen.

In this study, I presented a history of the Standards movement in mathematics education based on a premise that the Standards were not simply documents, but monuments of a discourse. Several Foucaultian theoretical and methodological concepts undergirded this study. These concepts allowed me to consider discourse and power in new ways and to question the historical meta-narrative established by NCTM through the histories that it published and commissioned (e.g., NCTM, 1970; Stanic & Kilpatrick, 2003b; 2003c). The result is not a traditional history that centers on a person, event, or idea. Rather, it is a history of a discourse that explores the conditions that made the discourse possible and problematizes the strategies that sustained it.

Due to Foucault’s lack of methodological explication, I had to create my own methodological assemblage appropriate to this study and the data that I collected. The data included the Standards documents, other official documents, responsive publications, prior historical work, and oral history interviews. In addition to negotiating how I would approach collecting and analyzing the data, I also encountered several ethical challenges related to the participants’ position within the profession and their
agreement to forego anonymity. Looking at the Standards-making process from a Foucaultian perspective revealed that there were three domains of authorship present: the writers, the externalities, and NCTM itself. Although authorship functions differently for each, they all contribute to forming and managing Standards-based mathematics education as a discourse.

In the historical narrative, I discussed some of the major points of curricular tension in 20th century education and mathematics education in the United States. These tensions—including debates between progressivism and traditional mathematics and between mathematicians and mathematics educators—motivated the formation of the NCTM. The same debates galvanized NCTM to take an active role in the development of mathematics education and its curricula when it seemed that the locus of control for these domains was outside of the discipline. *An Agenda for Action* represented the organization’s first move to regain control. Seeing the response to this first document, the leaders saw a need for more detail regarding curriculum, instruction, and assessment. They released the trilogy—CESSM, PSTM, and ASSM—in response. Although PSTM and ASSM did not receive as much attention as CESSM, all of the documents garnered much support and much critique. NCTM created the final Standards document, PSSM, in a radically different process to address those critiques and to attempt to bring different factions of the mathematics and mathematics education communities together.

NCTM published the Standards as resource guides (Crosswhite et al., 1989; Ferrini-Mundy, 2000; Hekimoglu & Sloan, 2005; Martin & Berk, 2001) for state and local curriculum developers to develop a mathematics curriculum that would prepare students for the challenges of global competitiveness in the Information Age. Ball (1994)
describes the *Standards* as a “sketch [of] directions and commitments, principles and aspirations” (p. 5). This set of documents represents the first attempt by an organization representing teachers to offer guidelines for school curricula on a national scale (Addington et al., 2000; Crosswhite et al., 1989; Ferrini-Mundy, 2000).

As I conclude this phase of inquiry, I return to Foucault’s key question of discourse: “How is it that one statement appeared rather than another?” (Foucault, 1969/1972a, p. 27). NCTM employed an intricate strategy to steer mathematics education reform toward the *Standards* not to elevate itself, but because it believed that its approach was right. The organization leveraged its position as the professional organization representing mathematics teachers and mathematics educators with increasing political interest in mathematics education to create the conditions of possibility that established the *Standards* as the standard for mathematics education reform in the United States.

Although this treatment of the *Standards* movement is comprehensive, it is by no means complete. There were many lines of flight (Deleuze & Guattari, 1980/1987) to be taken but I had to suppress my desire to write a comprehensive history\(^\text{92}\) in order to present a narrative that was thorough, manageable, and coherent. Although early questions remain unanswered and new questions have formed, there are some things that we as a community can glean from this narrative. In this chapter, I discuss the questions that linger and my charge for the mathematics education community.

---

\(^{92}\) I do not entertain the possibility of writing a complete history because such an effort is impossible. History, at best, can be comprehensive, addressing a large scope of issues in a deep way, but the limitations of the page, the researcher’s stamina, and the reader’s attention span may render comprehensiveness elusive. Even the incomplete history is subject to erasure. Like a historian, I see this work as “partial, tentative, and subject to revision or rejection in the future” (Gilderhus, 2010, p. 3).
What Remains Unsaid

As I expressed in Chapters 2 and 3, archaeology and genealogy offer very interesting ways of looking at history. I was initially attracted to their methodological openness, but that characteristic has been both a blessing and a curse. While I have been able to be creative in this process, not being able to reach a place of saturation, completion, or satisfaction has been a challenge. How could I contain all that I had learned in these few pages and do it in a way that appears thorough? Faced with what seemed to be an insurmountable task, I read and wrote and talked and thought as I addressed some key questions: What paths should I follow? How far should I go down those paths? Which paths should I avoid? Should I change my focus entirely? This constant negotiation caused me to leave much uninvestigated and unsaid.

One such example is my limited mention of the Math Wars. The complex relationship between mathematicians and mathematics educators could, itself, be an extensive dissertation study. I chose to play on the periphery of this debate because it would take me far away from my goal of providing a more general historical treatment—an overview of sorts—to be expanded at a later date, in other ways, and from other vantage points. Another reason for limiting discussion of the math wars is that I only had one side of the story, if you will. The narrators in this study included only those involved with the Standards. While there are a number of mathematicians represented here, they do not represent the “other side” of the math wars debate. Therefore, speaking of the math wars in any depth would be one-sided and unethical.

Another aspect of the Standards movement that remains uninvestigated is the relationship between the Standards and what mathematics is. I contend that, by creating
a set of documents that shape curriculum (and, as discussed in the previous chapter, could be considered as curriculum), NCTM has shaped school mathematics. Burrill (1997) confirms that the CESSM proposed a different way of looking at mathematics and at success in mathematics. She wrote:

The *Curriculum Standards* confronted what seemed to be an assumption: that learning mathematics was linear—that highly developed computational proficiency was necessary for students to learn algebra and geometry. The standards suggest there are important mathematical concepts students should experience and learn, regardless of their success or lack of success in another content area. The standards also suggest that these important content areas should be a part of the mathematics education of every child; that artificial barriers imposed by a system relegating certain students to a particular set of content knowledge or limiting their opportunity to learn would, in the long run, contribute to a society that was ill equipped to make use of mathematics as a way to think about and improve their world.

Following this path, the mathematics that students learn in school is the mathematics they know and post-secondary institutions must adapt to that. Marilyn Mays spoke of the American Mathematical Association of Two-Year Colleges’ (AMATYC) standards that were an outgrowth of the NCTM *Standards*:

I was an officer on the Board of AMATYC for ten years and had gotten off of the Board, I guess, in ‘97. While I was on the Board we got a grant from the National Science Foundation to write standards for introductory college mathematics below calculus and that was kind of a milestone in that I know that NSF had never given a grant to AMATYC before and I don’t know that they had given many to two-year colleges. So we spent about four years in the process of gathering information and writing the standards for two-year college mathematics....It’s called “A Crossroads in Mathematics: Standards for Introductory College Mathematics Before Calculus”.

As post-secondary institutions respond to students’ existing mathematical knowledge, the post-secondary mathematics program must change, as evidenced by AMATYC’s move to

---

93 Another area that I did not venture into during this study was the relationship between the *Standards* movement and post-secondary mathematics.
create appropriate standards. As students matriculate through levels of education and into the world beyond, they are equipped with a certain mathematics based upon their experiences. This mathematics, as it propagates and reproduces, becomes Mathematics, the definitive mathematics in the United States. In short, when followed to its logical conclusion, directing curriculum for school mathematics ultimately defines what mathematics is. The missing elements that I have mentioned are just a few in a potentially endless number of avenues for potential inquiry, some of which I plan to pursue and others that I hope that others will follow.

**Pessimistic Activism**

We, the mathematics education community, find ourselves on the precipice of another paradigm shift in mathematics education. The Common Core State Standards for Mathematics (CCSS-M) represent the first major mathematics education reform effort since the *Standards*. Although I cringe at the thought of there being a “moral” or “lesson” in this history of the *Standards*, I do believe that there is an important thought to take away and apply as we consider the CCSS-M: “everything is dangerous” (Foucault, 1983, p. 231).

Efforts to problematize existing structures or ideas can be perceived as cynical or pessimistic and, in some ways, there may be some truth in that perception. As I have stated several times throughout this study, it is not my intent to accuse NCTM, its officers, or representatives of any of its projects or products in any negative way. Although I cannot deny a note of pessimism, I am not asserting that *Standards*-based mathematics education has been bad for school mathematics. To claim that *Standards*-based mathematics education has been “good” or “bad” is reductive; school mathematics
is too complex for such simple claims. The issue here is that positioning a single
discourse as “right” for mathematics education is dangerous. Foucault (1983) explains:

   My point is not that everything is bad, but that everything is dangerous,
   which is not exactly the same as bad. If everything is dangerous, then we
   always have something to do. So my position leads not to apathy but to a
   hyper- and pessimistic activism. (pp. 231–232)

My pessimism, therefore, is not based on a fatalist view of the state of school
mathematics as a result of the Standards. Rather, it is a healthy skepticism that keeps me
from being lulled into complacency, believing that Standards-based mathematics
education has solved any of the problems that it was designed to address or that it has not
caused its own share of problems.

   I charge to the mathematics education community in the CCSS-M era and beyond
to maintain this sense of pessimistic activism. Although benefits are important, we must
exercise greater care in counting costs. Of course, new ideas should excite us, but we
must watch for the moment when those ideas show potential for physical, emotional,
psychological, or intellectual harm to any child. At that moment, we must be prepared to
act. Maintaining this level of preparation means stretching the boundaries of
mathematics education research so that we will be prepared with new possibilities to
address existing problems (Bullock, 2012; Stinson & Bullock, 2012). It also means not
building curricular, instructional, or assessment structures that are impermeable and
unchangeable. If our goal is to encourage our most valuable asset, children, then we must
maintain the humility of spirit required to abandon our individual and organizational
agendas for their good.
AFTERWORD

A LETTER TO THE NARRATORS

Dear Narrator,

I have thanked you several times for investing your time in this project and sharing two of your most treasured possessions—your time and your stories—with me, but I still feel that I have not thanked you enough. I could have written all of this on the “Acknowledgements” page, but the depth of my gratitude prompted me to make this statement as a part of the study. It is that important.

As I write, I close my eyes and recall the queasy feeling in the pit of my stomach as I pressed Send to make that first contact. I must confess to you that there were times that I would pick up the telephone to dial your number and have to stop, take several deep breaths, and try again. Some of you have been a part of my life as both a teacher and academic, while others were unknown to me until this project, but I leave this moment (but not this project) as a person who is richer because of the investment that you made in me.

You spoke freely. You laughed freely. You were always fair. You were critical of yourselves, your profession, and of the professional organization in which you have invested so much, yet you were never cynical. In the end, you were so accepting and accommodating that I wondered why I was ever nervous. As I listened to our conversations and read the transcripts, the devotion that you have to K–12 mathematics education and to education writ large rang in your words and dripped from the pages. I could not have asked for anything more.

It is my hope that, as you read through this study, I have represented you well. I
did not set out to write a dissertation with which you would all agree; I think that would be nearly impossible. Although you may not agree with some of my arguments, I hope it is apparent to you that I took great pains to be fair. My respect for you and your commitment to me is great and I hope that this work reflects that.

As I move forward, I will always hold you with me. I am grateful for the opportunity to get to know you even in the smallest way.

With all sincerity,

Erika
References


Krantz, & W. McCallum (Eds.), *Contemporary issues in mathematics education* (pp. 95–107). Cambridge, United Kingdom: Cambridge University Press.


Carlson, J. A. (2010). Avoiding traps in member checking. The Qualitative Report, 15,


Davison, H. M., & Schuler, N. D. (1964). State mathematics education services and Title


Walnut Creek, CA: Left Coast Press.


Kliebard, H. M. (1982). Education at the turn of the century: A crucible for curriculum


21–36.


Research Advisory Committee of the National Council of Teachers of Mathematics.


Research Advisory Committee of the National Council of Teachers of Mathematics.


Research Advisory Committee of the National Council of Teachers of Mathematics.


Research Advisory Committee of the National Council of Teachers of Mathematics.


Cambridge, MA: Harvard University Press.


Usiskin, Z. (1997a). Reforming the third r: Changing the school mathematics curriculum-


Walls, F. (2009). Of archaeology and genealogy: Choosing sites and tools. In
Mathematical subjects: Children talk about their mathematical lives (pp. 13–25).

London, United Kingdom: Springer.


Monthly, 87, 428–432.
<table>
<thead>
<tr>
<th>Name</th>
<th>Associated Document(s)</th>
<th>Brief Biography</th>
</tr>
</thead>
</table>
| Angela Andrews            | PSSM                   | Assistant Professor of Mathematics Education, National Louis University (Retired)  
Math Specialist, DuPage Children’s Museum  
Presidential Award for K–6 Mathematics, 1990                                          |
| Diane Briars              | CESSM, ASSM            | Senior developer and research associate, Intensified Algebra  
Mathematics director, Pittsburgh Public Schools, 1986–2006  
National Council of Supervisors of Mathematics President, 2009–2011  
NCTM Board of Directors, 1994–1997  
NCTM President, 2014–2016 |
| John Dossey               | CESSM, ASSM            | Distinguished Professor Emeritus of Mathematics, Illinois State University  
NCTM Lifetime Achievement Award, 1996  
NCTM Board of Directors, 1982–1985  
NCTM President, 1986–1988 |
| Mark Driscoll             | ASSM                   | Managing Project Director, Educational Development Center  
National Council of Supervisors of Mathematics Ross Taylor/Glenn Gilbert National Leadership Award, 2010 |
| Sue Eddins                | PSSM                   | Presidential Award for 7–12 Mathematics, 1989  
NCTM Board of Directors, 2000–2003 |
| Francis (Skip) Fennell    | PSSM                   | Member, National Mathematics Advisory Panel  
NCTM Lifetime Achievement Award, 2012  
NCTM Board of Directors, 1993–1996  
NCTM President, 2006–2008 |
| Glenda Lappan             | CESSM, PSTM, ASSM, PSSM| University Distinguished Professor of Mathematics, Michigan State University  
NCTM Lifetime Achievement Award, 2004  
NCTM Board of Directors, 1989–1992  
NCTM President, 1998–2000 |
<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Position and Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carol Malloy</td>
<td>PSSM</td>
<td>Associate Professor of Secondary Mathematics, University of North Carolina–Chapel Hill (Retired) Benjamin Banneker Association, President, 1997–1999 NCTM Board of Directors, 1999–2002</td>
</tr>
<tr>
<td>Alfred Manaster</td>
<td>PSSM</td>
<td>Professor Emeritus of Mathematics Education, University of California, San Diego</td>
</tr>
<tr>
<td>W. Gary Martin</td>
<td>PSSM</td>
<td>Emily R. and Gerald S. Leischuck Endowed Professor of Secondary Mathematics Education, Auburn University NCTM Director of Research, 1997–2000</td>
</tr>
<tr>
<td>Marilyn Mays</td>
<td>PSSM</td>
<td>Dean of the Division of Mathematics and Science, North Lake College Mathematics Excellence Award, American Mathematical Association of Two-Year Colleges, 2004 American Mathematical Association of Two-Year Colleges, President, 1994–1995</td>
</tr>
<tr>
<td>Mari Muri</td>
<td>ASSM</td>
<td>Senior Mathematics Consultant, Project to Increase Mastery of Mathematics and Science, Wesleyan University NCTM Board of Directors, 2003–2006</td>
</tr>
<tr>
<td>Nel Noddings</td>
<td>ASSM</td>
<td>Lee Jacks Professor of Education Emerita, Stanford University Inaugural American Educational Research Association Fellow Board member, Center for Critical Mathematics</td>
</tr>
<tr>
<td>Barbara Reys</td>
<td>PSSM</td>
<td>Curators’ Professor and Lois Knowles Faculty Fellow, University of Missouri Co-Director, Center for the Study of Mathematics Curriculum NCTM Board of Directors, 2002–2005</td>
</tr>
<tr>
<td>Gerald Rising</td>
<td>CESSM</td>
<td>Distinguished Teaching Professor Emeritus, University of Buffalo NCTM Board of Directors, 1975–1978</td>
</tr>
<tr>
<td>Judith Roitman</td>
<td>PSSM</td>
<td>Professor of Mathematics, University of Kansas Member, American Mathematical Society Committee on Education President, Association for Women in Mathematics</td>
</tr>
<tr>
<td>James Sandefur</td>
<td>PSSM</td>
<td>Professor and Chair, Department of Mathematics and Statistics, Georgetown</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Role</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Alan Schoenfeld</td>
<td>PSSM</td>
<td>Elizabeth and Edward Conner Professor of Education and Affiliated Professor of Mathematics, University of California, Berkeley Felix Klein Medal, 2011</td>
</tr>
<tr>
<td>James Schultz</td>
<td>CESSM</td>
<td>Robert L. Morton Emeritus Professor of Mathematics Education, Ohio University</td>
</tr>
<tr>
<td>Cathy Seeley</td>
<td>CESSM</td>
<td>Senior Fellow, Charles A. Dana Center, The University of Texas at Austin NCTM Board of Directors, 1988–1991 NCTM President, 2004–2006</td>
</tr>
<tr>
<td>William Speer</td>
<td>PSTM</td>
<td>Professor and Dean, College of Education, University of Nevada, Las Vegas</td>
</tr>
<tr>
<td>Lynn Steen</td>
<td>CESSM</td>
<td>Professor Emeritus of Mathematics, St. Olaf College Executive Director, Mathematical Sciences Education Board, 1992–1995</td>
</tr>
<tr>
<td>Bert Waits</td>
<td>CESSM</td>
<td>Professor Emeritus of Mathematics, The Ohio State University NCTM Board of Directors, 2000–2003</td>
</tr>
<tr>
<td>Linda Wilson</td>
<td>ASSM</td>
<td>Project Director, Project 2061, American Association for the Advancement of Science</td>
</tr>
</tbody>
</table>
Ms. Erika C. Bullock  
Doctoral Candidate - Mathematics Education  

July 1, 2012  

Dr. XXX  

Dear Dr. XXX:  

I hope this letter finds you well. My name is Erika Bullock; I am a doctoral candidate in mathematics education at Georgia State University. My major advisor is Dr. David Stinson, associate professor of mathematics education. My dissertation committee includes Dr. Janice Fournillier (qualitative methodologist), Dr. Philo Hutcheson (educational historian), and Dr. Pier Junor Clarke and Dr. Elizabeth DeFreitas of Adelphi University (mathematics educators). I am writing to invite you to participate in my dissertation research to document the process of developing, writing, disseminating, and implementing the National Council of Teachers of Mathematics (NCTM) standards documents.  


Through the acknowledgement sections of NCTM documents, I have identified a list of individuals who played significant roles in developing, writing, disseminating, and/or implementing these documents to participate in this oral history portion of the study. You have been chosen based upon your direct engagement with the *Curriculum and Evaluation Standards* published in 1989, the *Assessment Standards for School Mathematics* published in 1995, the *Principles and Standards for School Mathematics* published in 2000, your NCTM presidency, and your reputation within the mathematics education community in general.
In this project, it is my intent to explore how mathematics teacher effectiveness is defined (implicitly and explicitly) within national education policy (e.g., No Child Left Behind) and discipline policy (e.g., the NCTM standards). I believe that the proposed oral history interviews will offer a previously untapped perspective that analyzing the documents alone will not deliver. Each document represents a consensus among the individual members of the writing group and of the leadership of the NCTM at the time. Participating in the oral history will allow you the opportunity to create a historical record of your experiences and your interpretation of the standards movement.

I will conduct the interviews through September 2012 via telephone or in person as scheduling and resources allow. I will record and transcribe each interview. After transcription, I will present the narrative of the interview to you for review. I also will present the final chapter of the dissertation to the participants for review prior to submitting it to my dissertation committee. Evidently, oral history is not anonymous; therefore, I will offer you the opportunity to review the narrative within and to negotiate the use of your words in the history.

I sincerely hope that you will consider participating in this important effort to document the genealogy of mathematics teacher effectiveness. The favor of your reply is requested by July 16, 2012. If you agree to participate, I will contact you to schedule the interview at your convenience.

Please contact me as specified below with any questions (or you may contact Dr. Stinson at dstinson@gsu.edu). Enclosed for your review are a list of possible interview questions and my current curriculum vitae.

Kindest Regards,

Erika C. Bullock
Doctoral Candidate, Mathematics Education
(404) 861-3374
ebullock1@student.gsu.edu
APPENDIX C

POTENTIAL INTERVIEW QUESTIONS SENT TO PARTICIPANTS

A Genealogy of Mathematics Teacher Effectiveness
Tentative Questions for Oral History Interview

Participation Background

- Describe your position in the mathematics education community prior to participating on the writing committee.
- What was your relationship with NCTM prior to participating on the writing committee?
- How were you selected to be a part of the standards writing process?
  - Was there an application process or were you selected?
  - How were you notified?

The Developing Process

- As you understand it, what was the impetus for writing the document?
- Was there a framework provided prior to commencing the writing process?

The Writing Process

- Describe the makeup of the writing committee.
- How did the group function logistically?
  - Where did you meet?
  - Was there a leadership structure?
  - How was the leadership structure created?
  - Was there a charge given to the group?
  - How often did you meet?
  - What were the responsibilities during and outside of the meetings?
- What was the intent of the document, as you understood it?

The Disseminating Process

- What did you expect would come from the publication of the document?
- How did you feel about the final document that was made available to the public?

The Implementing Process

- How do you feel the documents have been implemented?
- How do you think federal, state, and local departments of education have used the standards?
  - How has it been beneficial?
  - How has it negated the intentions of the standards?
- Looking back, how would you describe how the documents have been used in context of the reform conversation that followed?
Dr. XXX,

Thank you, again, for taking the time to participate in the oral history interview for my dissertation. Your contribution to the project is truly invaluable.

Attached please find the edited transcript of our interview for your review. In transcribing the interview, I first created a verbatim transcript and then edited that transcript to eliminate speech pauses, repeated words, and other elements that hindered its readability. I made my best effort to form each of our thoughts into complete sentences to make them more friendly for quotation in the dissertation. I added words in brackets to make sentences clear and italicized words that you seemed to emphasize in the interview. I have also included comments in places where I may have assumed meaning or may have been unclear from the audio. If you would like to see the verbatim transcript, I would be happy to send it to you.

Please read over the transcript and make any changes as you see fit. To help me to be sure that I am clear about what is appropriate to use, please use the following guidelines for editing:

- If there is information that you would not like to be used in direct quotation (directly attributed to you), please highlight in yellow.
- If there is information that you would like to be considered “off the record”, please highlight in red.

In the interview, you indicated some things that you did not want quoted. I have already highlighted those sections in the transcript.

Please return the reviewed transcript to me by **October 15, 2012**. I will send a reminder as this date approaches. If I do not hear from you, I will assume that the transcript is acceptable as written.

Thanks again!

All the best,

Erika
APPENDIX E

NCTM ELECTED OFFICERS AND EXECUTIVE DIRECTORS

NCTM Presidents 1970-present\(^{94}\)

(a similar table appears in McLeod, 1996, p. 21)

<table>
<thead>
<tr>
<th>Term</th>
<th>President</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972–1974</td>
<td>Eugene P. Smith</td>
</tr>
<tr>
<td>1976–1978</td>
<td>John C. Egsgard</td>
</tr>
<tr>
<td>1978–1980</td>
<td>Shirley A. Hill</td>
</tr>
<tr>
<td>1980–1982</td>
<td>Max A. Sobel</td>
</tr>
<tr>
<td>1982–1984</td>
<td>Stephen S. Willoughby</td>
</tr>
<tr>
<td>1984–1986</td>
<td>F. Joe Crosswhite</td>
</tr>
<tr>
<td>1986–1988</td>
<td><strong>John A. Dossey</strong></td>
</tr>
<tr>
<td>1988–1990</td>
<td>Shirley M. Frye</td>
</tr>
<tr>
<td>1990–1992</td>
<td>Iris M. Carl</td>
</tr>
<tr>
<td>1994–1996</td>
<td>Jack Price</td>
</tr>
<tr>
<td>1996–1998</td>
<td>Gail Burrill</td>
</tr>
<tr>
<td>1998–2000</td>
<td><strong>Glenda Lappan</strong></td>
</tr>
<tr>
<td>2000–2002</td>
<td><strong>Lee Stiff</strong></td>
</tr>
<tr>
<td>2002–2004</td>
<td>Johnny Lott</td>
</tr>
<tr>
<td>2004–2006</td>
<td><strong>Cathy Seeley</strong></td>
</tr>
<tr>
<td>2006–2008</td>
<td><strong>Francis (Skip) Fennell</strong></td>
</tr>
<tr>
<td>2010–2012</td>
<td>J. Michael Shaughnesssey</td>
</tr>
<tr>
<td>2012–2014</td>
<td>Linda M. Gojak</td>
</tr>
<tr>
<td>2014–2016</td>
<td><strong>Diane Briars</strong></td>
</tr>
</tbody>
</table>

\(^{94}\) Names in **bold** are participants in this study.
## NCTM Executive Directors

<table>
<thead>
<tr>
<th>Term</th>
<th>Executive Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997–1998</td>
<td>James M. Rubillo</td>
</tr>
<tr>
<td>1998–2001</td>
<td>John A. Thorpe</td>
</tr>
<tr>
<td>2001–2009</td>
<td>James M. Rubillo</td>
</tr>
<tr>
<td>2009–present</td>
<td>Kichoon Yang</td>
</tr>
</tbody>
</table>

## NCTM Executive Board Members

NCTM Executive Board Members, 1970-present

<table>
<thead>
<tr>
<th>Term</th>
<th>Board Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969–1972</td>
<td>John F. Devlin; Helen F. Kriegsman; Lehi T. Smith</td>
</tr>
<tr>
<td>1970–1972</td>
<td>Mary E. Stine</td>
</tr>
<tr>
<td>1970–1973</td>
<td>Louis S. Cohen; Anna Marie Evans; James N. Hardesty; Lyn McLane</td>
</tr>
<tr>
<td>1971–1972</td>
<td>Elizabeth A. Collins</td>
</tr>
<tr>
<td>1971–1974</td>
<td>James F. Gray; L. Doyal Nelson; Richard Pieters</td>
</tr>
<tr>
<td>1972–1974</td>
<td>Jack Price</td>
</tr>
<tr>
<td>1972</td>
<td>Myron F. Rosskopf</td>
</tr>
<tr>
<td>1972–1975</td>
<td>Charles E. Allen; Shirley A. Hill; Thomas J. Hill; Gwen H. Shufelt</td>
</tr>
<tr>
<td>1974–1977</td>
<td>Geraldine Green; Joan E. Kirkpatrick; Leroy Sachs; Max A. Sobel</td>
</tr>
</tbody>
</table>

95 This is a complete list of the Executive Directors of NCTM.

96 Names in **bold** are participants in this study.
<table>
<thead>
<tr>
<th>Years</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975–1978</td>
<td>Mary E. Froustet; George Immerseel; <strong>Gerald R. Rising</strong>; Gladys M. Thompson</td>
</tr>
<tr>
<td>1976–1979</td>
<td>Betty Beaumont; F. Joe Crosswhite; Floyd L. Downs; Vernon R. Hood</td>
</tr>
<tr>
<td>1978–1981</td>
<td>Edgar L. Edwards, Jr.; Gail D. Lowe; Catherine D. Tobin; James W. Wilson</td>
</tr>
<tr>
<td>1979–1980</td>
<td>Sarah M. Burkhart</td>
</tr>
<tr>
<td>1979–1982</td>
<td>Jane E. Martin; Douglas J. Potvin; James M. Rubillo</td>
</tr>
<tr>
<td>1980–1982</td>
<td>Chris Boldt</td>
</tr>
<tr>
<td>1980–1983</td>
<td>Bruce C. Burt; Theresa I. Denman; Betty K. Lichtenberg; Marilyn N. Suydam</td>
</tr>
<tr>
<td>1982–1985</td>
<td><strong>John A. Dossey</strong>; Patricia M. Hess; Bob Robinson; Wallace D. Rogelstad</td>
</tr>
<tr>
<td>1983–1986</td>
<td>Louis G. Henkel; Margaret J. Kenney; Genevieve M. Knight; Louise M. Smith</td>
</tr>
<tr>
<td>1984–1987</td>
<td>Joan L. Akers; Albina S. Cannavaciolo; Philip L. Cox; Marilyn L. Hala</td>
</tr>
<tr>
<td>1985–1988</td>
<td>Katherine P. Layton; Mary M. Lindquist; Donald M. Hight; Ronald Wittner</td>
</tr>
<tr>
<td>1986–1989</td>
<td>David J. Glatzer; Henry S. Kepner, Jr.; Mary Harley Kruter; Bonnie H. Litwiller</td>
</tr>
<tr>
<td>1987–1990</td>
<td>Judith Adams; Mary M. Hatfield; Larry L. Luck; Dorothy S. Strong</td>
</tr>
<tr>
<td>1988–1991</td>
<td>Fred Crouse; Oward C. Johnson; <strong>Cathy L. Seeley</strong>; Lee E. Yunker</td>
</tr>
<tr>
<td>1990–1993</td>
<td>Gail F. Burrill; Frances R. Curcio; Richard D. Lodholz; <strong>Lee V. Stiff</strong></td>
</tr>
<tr>
<td>1991–1994</td>
<td>Ian C. DeGroot; Daniel T. Dolan; David R. Johnson; Beverly W. Nichols</td>
</tr>
<tr>
<td>1993–1996</td>
<td><strong>Francis (Skip) Fennell</strong>; Christian R. Hirsch; Sue Ann McGraw; Joan Ferrini-Mundy</td>
</tr>
<tr>
<td>Years</td>
<td>Presidents</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------</td>
</tr>
<tr>
<td>1994–1997</td>
<td><strong>Diane J. Briars</strong>; Robert Koss; Paul R. Trafton; Lorna Fay Wiggan</td>
</tr>
<tr>
<td>1995–1998</td>
<td>Jerry P. Becker; Peggy House; Sanda M. Powers; Zalman Usiskin</td>
</tr>
<tr>
<td>1996–1999</td>
<td>Patricia F. Campbell; Dwight A. Cooley; Linda M. Gojak; Johnny W. Lott</td>
</tr>
<tr>
<td>1997–2000</td>
<td>Ann M. Carlyle; Loring (Terry) Coes, III; Richard Kopan; Steven Leinwand</td>
</tr>
<tr>
<td>1998–2001</td>
<td>Rita C. Janes; Thomas R. Lewis; Karen Longhart; John Van de Walle</td>
</tr>
<tr>
<td>1999–2002</td>
<td>Judith E. Jacobs; Frank K. Lester, Jr.; <strong>Carol E. Malloy</strong>; Beatrice Moore-Harris</td>
</tr>
<tr>
<td>2000–2003</td>
<td>Mary Buck; <strong>Susan K. Eddins</strong>; Judith Sowder; <strong>Bert K. Waits</strong></td>
</tr>
<tr>
<td>2001–2004</td>
<td>Cindy Chapman; Carolyn Kieran; Mark Saul; J. Michael Shaughnessy</td>
</tr>
<tr>
<td>2002–2005</td>
<td>Laurie Boswell; Gail R. Englert; <strong>Barbara J. Reys</strong>; Mike Koehler</td>
</tr>
<tr>
<td>2003–2006</td>
<td>Cynthia G. Bryant; M. Kathleen Heid; <strong>Mari Muri</strong>; Anthony A. Scott</td>
</tr>
<tr>
<td>2004–2007</td>
<td>Jennie M. Bennett; David DeCoste; Bonnie J. Hagelberger; Richard T. Seltz</td>
</tr>
<tr>
<td>2005–2008</td>
<td>Ruth M. Casey; Shelley Kim Ferguson; Audrey L. Jackson; Nora G. Ramirez</td>
</tr>
<tr>
<td>2006–2009</td>
<td>Don S. Balka; John A. Carter; Beatriz S. D’Ambrosio; Margaret (Peg) Smith</td>
</tr>
<tr>
<td>2007–2010</td>
<td>Marshalyn E. Baker; Vena M. Long; Jacqueline Goodloe Smith; Christine Suurtamm</td>
</tr>
<tr>
<td>2008–2011</td>
<td>Frederck L. Dillon; Karen Karp; Jennifer Salls; Christine D. Thomas</td>
</tr>
<tr>
<td>2009–2012</td>
<td>Barbara J. Dougherty; Diana V. Lambdin; David K. Masunaga; Judith Zawojewski</td>
</tr>
<tr>
<td>2010–2013</td>
<td>Kimberly Mueler; Anne M. Collins; Debbie Duvall; Matthew R. Larson</td>
</tr>
<tr>
<td>2011–2014</td>
<td>Robert Q. Berry, III; Dane R. Camp; Mark W. Ellis; Latrenda Knighten</td>
</tr>
<tr>
<td>2012–2015</td>
<td>Margaret (Peg) Cagle; Karen J. Graham; Gladis Kersaint; Jonathan (Jon) Wray</td>
</tr>
</tbody>
</table>
APPENDIX F

CURRICULUM AND EVALUATION STANDARDS FOR SCHOOL MATHEMATICS

WRITING GROUPS

The NCTM Commission on Standards for School Mathematics
Thomas A. Romberg, Chair
Iris M. Carl
F. Joe Crosswhite
John A. Dossey
James D. Gates
Shirley Frye
Shirley A. Hill

Christian R. Hirsch
Glenda Lappan
Dale Seymour
Lynn A. Steen
Paul R. Trafton
Norman Webb

Members of the Working Groups

K–4
Paul R. Trafton, Chair
Hilde Howden
Mary M. Lindquist
Edward C. Rathmell
Thomas E. Rowan
Charles S. Thompson

9–12
Christian R. Hirsch, Chair
Sue Ann McGraw
Cathy L. Seeley
Gerald R. Rising
Harold L. Schoen
Bert K. Waits

5–8
Glenda Lappan, Chair
Daniel T. Dolan
Joan F. Hall
Thomas E. Kieren
Judith E. Mumme
James Schultz

Evaluation
Norman Webb, Chair
Elizabeth Badger
Diane J. Briars
Thomas J. Cooney
Tej N. Pandey
Alba G. Thompson

97 Names in bold are participants in this study.
APPENDIX G

PROFESSIONAL STANDARDS FOR TEACHING MATHEMATICS WRITING

GROUPS

The NCTM Commission on Teaching Standards for School Mathematics

Glenda Lappan, Chair  
Iris M. Carl  
Shirley Frye  
James D. Gates  

Glenda Lappan  
Michigan State University
Iris M. Carl  
Houston Independent School District
Shirley Frye  
Scottsdale School District
James D. Gates  
NCTM Executive Director

Board Liaison

Lee. V. Stiff  
North Carolina State University

Working Group Members

Mathematics Teaching

Deborah Ball, Chair  
Evelyn Bell  
Roberta Koss  
Steve Krulik  
Jane Schielack  
Thomas Schroeder, Assistant/Reactor  

Deborah Ball  
Michigan State University
Evelyn Bell  
Ysleta Independent School District, El Paso, Texas
Roberta Koss  
Redwood High School, Larkspur, California
Steve Krulik  
Temple University
Jane Schielack  
Texas A&M University
Thomas Schroeder  
University of British Columbia

Evaluation of Mathematics Teaching

Thomas Cooney, Chair  
Donald Chambers, Assistant/Reactor  
Marilyn Hala  
Tim Kanold  
Diane Thiessen  
Sue Poole White  

Thomas Cooney  
University of Georgia
Donald Chambers  
Wisconsin State Department of Education
Marilyn Hala  
NCTM Headquarters Staff
Tim Kanold  
Stevenson High School, Prairie View, Illinois
Diane Thiessen  
University of Northern Iowa
Sue Poole White  
Banneker High School, Washington, DC

Professional Development of Teachers of Mathematics

Susan Friel, Chair  
Nicholas Branca, Assistant/Reactor  
Bettye Clark  
Julie Keener  
James Leitzel  
Gary Musser  
William Speer  

Susan Friel  
University of North Carolina, Chapel Hill
Nicholas Branca  
San Diego State University
Bettye Clark  
Clark Atlanta University
Julie Keener  
Hillside Junior High School, Boise, Idaho
James Leitzel  
Ohio State University
Gary Musser  
Oregon State University
William Speer  
Bowling Green State University

98 Names in bold are participants in this study.
APPENDIX H

ASSESSMENT STANDARDS FOR SCHOOL MATHEMATICS WRITING GROUPS

Management Working Group
Thomas A. Romberg, *Project Director*
Linda D. Wilson, *Assistant Director*
Marvin E. Smith, *Research Assistant*
James D. Gates, *ex officio*
Mary M. Lindquist, *ex officio*
Jack Price, *ex officio*
Norman L. Webb, *Consultant*

University of Wisconsin–Madison
University of Delaware
University of Wisconsin–Madison
National Council of Teachers of Mathematics
Columbus College, Georgia
California State Polytechnic University
University of Wisconsin–Madison

Standards Working Group
Jeremy Kilpatrick, *Chair*
James W. Wilson, *Assistant Chair*
Diane J. Briars

Jane D. Gawronski
Ed Reidy
Maria Santos
Denise Spangler Mewborn, *Research Assistant*

University of Georgia
University of Georgia
Pittsburgh Public Schools, Pennsylvania
Escondido Union High School District, California
Kentucky Department of Education
San Francisco Public Schools, California
University of Georgia

Purposes Working Group
Jane D. Gawronski, *Cochair*
Diane J. Briars, *Cochair*

Sandra P. Marshall, *Co-Assistant Chair*
Mark Driscoll, *Co-Assistant Chair*

Harold Asturias
Ruth Cossey
Clare Forseth
Dennis L. Garvin
Marieta Harris
Jean M. Joyner

University of Georgia
Pittsburgh Public Schools, Pennsylvania
San Diego State University/CRMSE, California
Education Development Center, Massachusetts
California Renaissance Project and New Standards Project
Mills College, California
Marion Cross Schools, Vermont
Baltimore County Public Schools, Maryland
Memphis City Schools, Tennessee
North Carolina Department of Public

99 Names in bold are participants in this study.
Susanne Lajoie  
Diana V. Lambdin  
Richard D. Lodholz  
Mari Muri  

**Instruction**  
McGill University, Quebec  
Indiana University  
Parkway School District, Missouri  
Connecticut Department of Education  

**Outreach**  
Portia C. Elliott, *Coordinator*  
Thomas Lewis  

**Support Staff**  
Margaret H. Powell, *Editor*  
Kathleen Steele, *Production Editor*  

**Resource Group**  
Sherry Beard  
Alan J. Bishop  
Sharon R. Chavez  

**John A. Dossey**  
Glenda Lappan  
Douglas McRae  
Rep. Annette N. Morgan  

**Nel Noddings**  
Andrew C. Porter  
Edward Roeber  

Ramsey W. Selden  

**Lee V. Stiff**  
Vance Wilson  
Dennie Palmer Wolf  

University of Massachusetts at Amherst  
Moline School District, Illinois  
University of Wisconsin–Madison  
University of Wisconsin–Madison  
Bellevue School District, Washington  
Monash University, Australia  
San Felipe Pueblo Elementary School, New Mexico  
Illinois State University at Normal  
Michigan State University  
Monterey, California  
State of Missouri  
Stanford University, California  
University of Wisconsin–Madison  
Council of Chief State School Officers, District of Columbia  
Council of Chief State School Officers, District of Columbia  
North Carolina State University  
University of Delaware  
Harvard University, Massachusetts
APPENDIX I

PRINCIPLES AND STANDARDS FOR SCHOOL MATHEMATICS WRITING

GROUPS

Commission on the Future of the Standards
Mary M. Lindquist, Chair
Columbus State University
Shelley Ferguson, Standards 2000 Outreach Coordinator
National Council of Teachers of Mathematics
Fred Crouse
Annapolis Valley Regional School Board
Portia Elliott
University of Massachusetts, Amherst
Mazie Jenkins
Madison Metropolitan School District
Jeremy Kilpatrick
University of Georgia
Michael Koehler
Blue Valley North High School
James R. C. Leitzel
University of New Hampshire
Marilyn Mays
North Lake College
Richard Schown
Stanford University
Bonnie Hanson Walker
Lamar Consolidated Independent School District

Writing Group
Joan Ferrini-Mundy, Chair
University of New Hampshire/Michigan State University
W. Gary Martin, Project Director
National Council of Teachers of Mathematics

Grades Pre-K–2
Jeane Joyner, Chair
North Carolina Department of Public Instruction
Angela Andrews
Scott School
Douglas H. Clements
State University of New York at Buffalo
Alfinio Flores
Arizona State University
Carol Midgett
Southport Elementary School
Judith Roitman
University of Kansas

Grades 3–5
Barbara Reys, Chair
University of Missouri–Columbia
Francis (Skip) Fennell
Western Maryland College
Catherine M. Fueglein
Webster Groves School District
Melinda Hamilton
Rosemont Elementary School
Melissa Manzano-Alemán
Fort Worth Independent School District
Susan Jo Russell
Education Research Collaborative, TERC
Philip Wagreich
University of Illinois at Chicago

100 Names in bold are participants in this study.
### Grades 6–8

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edward A. Silver</td>
<td>University of Pittsburgh</td>
</tr>
<tr>
<td>Mary Bouck</td>
<td>Battle Creek Public Schools</td>
</tr>
<tr>
<td>Jean Howard</td>
<td>C. R. Anderson Middle School</td>
</tr>
<tr>
<td>Diana Lambdin</td>
<td>Indiana University Bloomington</td>
</tr>
<tr>
<td><strong>Carol Malloy</strong></td>
<td>University of North Carolina at Chapel Hill</td>
</tr>
<tr>
<td><strong>James Sandefur</strong></td>
<td>Georgetown University</td>
</tr>
</tbody>
</table>

### Grades 9–12

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alan Schoenfeld</strong>, Chair</td>
<td>University of California at Berkeley</td>
</tr>
<tr>
<td>Sue Eddins</td>
<td>Illinois Mathematics and Science Academy</td>
</tr>
<tr>
<td>M. Kathleen Heid</td>
<td>Pennsylvania State University</td>
</tr>
<tr>
<td>Millie Johnson</td>
<td>Western Washington University</td>
</tr>
<tr>
<td>Ron Lancaster</td>
<td>The Bishop Strachan School</td>
</tr>
<tr>
<td><strong>Alfred Manaster</strong></td>
<td>University of California–San Diego</td>
</tr>
<tr>
<td>Milton Norman</td>
<td>Granby High School</td>
</tr>
</tbody>
</table>

### Electronic Format Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrique Galindo, Chair</td>
<td>Indiana University Bloomington</td>
</tr>
<tr>
<td>S. Thomas Gorski</td>
<td>The Gilman School</td>
</tr>
<tr>
<td>Beverly Hunter</td>
<td>Boston College</td>
</tr>
<tr>
<td>Eugene Klotz</td>
<td>Swarthmore College/Math Forum</td>
</tr>
<tr>
<td>Nanette Seago</td>
<td>Video Cases for Mathematics Professional Development</td>
</tr>
<tr>
<td>Len Simutis</td>
<td>Eisenhower National Clearinghouse for Mathematics and Science Education</td>
</tr>
</tbody>
</table>

### Editors

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jean Carpenter</td>
<td>National Council of Teachers of Mathematics</td>
</tr>
<tr>
<td>Sheila Gorg</td>
<td>National Council of Teachers of Mathematics</td>
</tr>
</tbody>
</table>

### Cover Design, Book Design, and Illustration

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debra G. Kushner</td>
<td>National Council of Teachers of Mathematics</td>
</tr>
</tbody>
</table>