

TEACHER RECRUITMENT AND RETENTION IN A HIGH-STAKES ERA: THE CASE OF
MICHIGAN

By

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ABSTRACT

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In the United States and other countries around the world, K-12 school administrators are recruiting more novice teachers than ever. These novice teachers must learn to teach in a challenging context of new curricular standards, increasing accountability reforms, and growing student diversity. The challenges of learning to teach in the context of shifting reforms and demographics contribute to the persistent challenge of novice teacher recruitment and retention, especially in STEM subjects like mathematics. Indeed, among university graduates with similar levels of mathematics preparation, fewer choose to enter teaching than other careers. Furthermore, compared to novice teachers in other content areas, novice mathematics teachers may be more likely to leave the teaching profession or move to schools with better working conditions. When novice teachers, especially teachers of mathematics, leave the teaching profession or move to more affluent schools, it further disadvantages marginalized student populations by limiting their access to quality teachers. Given the challenges of recruiting qualified teachers in STEM subjects like mathematics and the ramifications of teacher turnover, it is increasingly important to understand the role of policy demands in shaping the experiences of novice mathematics teachers' working in challenging contexts and how these policies may be better aligned to teachers' development needs, thereby supporting long-term commitment to the teaching profession.

In this study I used policy enactment and socialization frameworks to analyze under-conceptualized interactions between the macro-level education policy context and micro-level

teaching practices of a sample of novice middle school mathematics teachers working in schools serving disadvantaged students in Michigan. I sought to describe the ways in which the backgrounds of these teachers, and the contexts in which they taught, mediated policies aimed at shaping their teaching practices. Furthermore, I sought to illustrate how the teachers' backgrounds and contexts were related to their recruitment, success teaching diverse students, job satisfaction, and intention to remain in the teaching profession.

This study draws from data collected for the cross-national proof-of-concept study known as the First Five Years of Mathematics Teaching, or FIRSTMATH. The main data for this dissertation comes from in-depth interviews from a focused group of four novice middle school mathematics teachers. The interview data is complemented by data from a small sample of secondary novice teachers of mathematics to describe their backgrounds, teaching contexts, and practices.

I argue that while it is expected that better prepared teachers recruited to work in supportive school environments and whose values align with education reforms may be better able to demonstrate practices that align with policy reforms, express greater job satisfaction, and may choose to remain in the profession, this study begins to reveal that other factors having to do with teachers immediate practices (e.g., ability to manage classrooms, plan and deliver effective lessons, and improve student learning) are more powerful influences on how successful they feel as teachers and may, in turn, affect their long-term intentions to stay in teaching.

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INTRODUCTION

In the United States and other countries, K-12 school administrators are recruiting more novice teachers than ever. For example, the modal teacher in the United States in 2012 had just five years of teaching experience (Ingersoll, Merrill & Stuckey, 2014). Globally, 11 out of the 23 countries participating in the 2008 Teaching and Learning International Survey (TALIS) reported that novice teachers (i.e., those with fewer than five years of teaching experience) comprised more than 20% of the teaching workforce at the lower secondary level (Jensen, Sandoval-Hernandez, Knoll & Gonzalez, 2012). In fact, in some TALIS countries (e.g., Turkey) novice teachers made up more than 40% of the workforce at the lower secondary level. Proportions of novice teachers are likely even higher in some Sub-Saharan African countries, where governments must combat massive teacher shortages (UNESCO, 2015).

Teacher shortages can be an enduring challenge in developing countries as well. Schools in the United States serving high concentrations of low-income, low-achieving, and/or minority students, for example, are often labelled “hard to staff” schools (Darling-Hammond & Sykes, 2003). In addition, school leaders often face difficulties recruiting teachers to work with children with disabilities and English language learners (ELLs), or in fields like mathematics and science (Darling-Hammond & Sykes, 2003).

At the same time, international research on future secondary mathematics teachers indicates that novice teachers are anxious to enter the classroom and assist the youth of their respective countries. Specifically, in 2008, future mathematics teachers chose to enter the teaching profession because they were interested in working with young people, influencing the next generation, and they felt that they had a talent for teaching (Tatto, Schwille, Senk, Ingvarson, Rowley, Peck, Bankov, Rodriguez & Reckase, 2012).

Yet novice teachers must learn to teach in a challenging context of new curricular standards, increasing accountability reforms, and growing student diversity. In fact, over the past three decades education policymakers in many countries have implemented changes to content standards and curriculum, and intensified accountability reforms, in an effort to improve their respective education systems (Mehta, 2014; Tatto, 2009; U.S. Department of Education, 2014). Teachers, widely acknowledged as the most important school-based influence on student learning (OECD, 2005; RAND, 2012; Rivkin, Hanushek & Kain, 2005; UNESCO, 2014), are often the targets of such reforms.

Many standards and accountability reforms aim to aid student learning in the most disadvantaged schools, where novice teachers often work (Clotfelter, Ladd & Vigdor, 2005). These reforms, while impacting both novice and experienced teachers, may impose disproportionate burdens on novices by holding them to the same high standards as experienced teachers, even as they struggle to learn to teach within the culture and norms of new schools, often without the information or resources necessary for effectiveness (Stanulis, Burrill & Ames, 2007).

While they adjust to new school and reform contexts, novice teachers across the country must also teach an increasingly diverse population of students. In the United States, for example, 2014 marked the first year that the overall number of K-12 Latino, African-American, and Asian students grew larger than the number of white students (Maxwell, 2014). Additionally, across the globe, the number of people living outside the countries of their birth increased by half between 1990 and 2000, a rate that is only expected to increase (Burns & Shadoin-Gersing, 2010).

The challenges of learning to teach in the context of shifting reforms and demographics contribute to the persistent problem of novice teacher retention, especially in STEM subjects like

mathematics. In the United States, for instance, it has been widely reported that nearly half of all teachers leave the profession within five years of teaching (Ingersoll, 2003). More recent estimates indicate that 41% of the teachers leave before the five year mark, citing dissatisfaction with a number of working conditions including salaries, resources, student misbehavior, accountability, development opportunities, influence over decision-making, and school leadership (Ingersoll et al., 2014).

Compared to novice teachers in other content areas, novice mathematics teachers may be more likely to leave the teaching profession or move to schools with better working conditions. For example, past studies of math and science teachers in Michigan (Murnane, Singer, Willett, Kemple & Olsen, 1991) found that teachers with advanced math and science knowledge and skills often leave the profession for positions in business and industry. Nationally, math and science teachers who remain in the teaching profession tend to move to more affluent, suburban schools with lower proportions of minority students (Ingersoll & May, 2010).

When novice teachers, especially teachers of mathematics, leave the teaching profession or move to more affluent schools, it further disadvantages marginalized student populations by limiting their access to quality teachers. Given the challenges of recruiting qualified teachers in STEM subjects like mathematics and the ramifications of teacher turnover, it is increasingly important to understand the role of policy demands in shaping the experiences of novice mathematics teachers' working in challenging contexts and how these policies may be better aligned to teachers' development needs, thereby supporting long-term commitment to the teaching profession.

Therefore, drawing on policy enactment (Ball, 1998), socialization (Achinstein, Ogawa & Spiegelman, 2004), and teaching practice (Michigan State University, 2016) frameworks, this study addresses the following research questions:

1. What characterizes the current policy context of middle school mathematics teaching in the state of Michigan? How is this context a case of a larger national and global trend?
2. What are the demands placed on novice middle school teachers of mathematics by current state education accountability policies? How are these demands reflected in the contexts in which these teachers teach and in their practices?
3. How does the school context and teacher socialization, as expressed by teachers' backgrounds, mediate novice middle school mathematics teachers' practices? How do socialization and policy mandates affect how they approach the teaching of diverse pupils, their job satisfaction, and their intentions to remain in the teaching profession?

As in many other states and countries, the current policy and education context in Michigan poses numerous challenges for novice teachers. First, they enter a profession that many consider to be in a state of crisis. The 2016 Education Trust – Midwest *Michigan Achieves* report, for instance, calls for “rebuilding Michigan’s broken public education system” (Arellano, Bedi & Gallagher, 2016). Moreover, the authors suggest that the “rebuilding” of Michigan’s education system would benefit from the adoption of education policies from “leading” states that include “relentless” focus on teacher quality, clear and high standards, and strong accountability systems. These forces already place considerable demands on novice teachers as they must become acclimated to new roles and organizations and learn to teach while also

learning new content standards and preparing for increasingly high stakes evaluations of their teaching effectiveness.

In this study, I concentrate on novice middle school mathematics teachers who are teaching in challenging school contexts (e.g., large proportions of low-achieving and/or economically disadvantaged students) because these teachers are seen as key to successful reform efforts and because these schools are under greater pressure than less challenging schools to respond to current accountability policies. Furthermore, middle school is a crucial point of transition in U.S. schooling and teacher effectiveness can impact students' success in high school and beyond (Schmidt, Blomeke & Tatto, 2011). For example, the classes that students take in middle school (e.g., Algebra) can influence their preparedness for more advanced high school courses. This suggests that the most disadvantaged students would benefit by learning from the most experienced teachers; yet, research indicates that novice mathematics teachers actually tend to work with the most disadvantaged students (e.g., Clotfelter et al., 2005).

In this study, I argue that current policy demands on schools and teachers reveal a paradox in which policies designed to improve learning in the most underserved schools impose disproportionate burdens on novice middle school mathematics teachers. Additionally, while some might argue that expectations of novice teachers' skill levels should be relatively low (Berliner, 2001), accountability reforms demand that these teachers perform to the same standards as experienced teachers, but with fewer resources to meet such expectations. That is, those schools and teachers under the greatest accountability pressure (i.e., schools and teachers serving disadvantaged students) may have the fewest resources to improve. Furthermore, while it is expected that better prepared teachers recruited to work in supportive school environments and whose values align with education reforms may be better able to demonstrate practices that align

with policy reforms, express greater job satisfaction, and may choose to remain in the profession, this study begins to reveal that other factors having to do with teachers' immediate practices (e.g., ability to manage classroom, plan and deliver effective lessons, and improve student learning) are more powerful influences on how successful they feel as teachers and may, in turn, affect their long-term intentions to stay in teaching.

This study draws from data collected for the cross-national proof-of-concept study known as the First Five Years of Mathematics Teaching, or FIRSTMATH (Tatto, 2015; Tatto, 2016). FIRSTMATH collected data from novice mathematics teachers in several international contexts, including the state of Michigan. For this dissertation, the author, who worked as a research assistant for the FIRSTMATH study, obtained permission to use selected data from the questionnaire, observations, and interviews designed for FIRSTMATH. The main data for this dissertation comes from in-depth interviews from a focused group of four middle school mathematics teachers. The data is complemented by data from a small sample of secondary novice mathematics teachers in Michigan to describe their backgrounds, teaching contexts, and practices.

In the following sections I review the relevant literature (chapter 1), describe the analytical frameworks (chapter 2), and present the methods used to conduct this study (chapter 3) before describing the educational policy context of Michigan (chapter 4), novice teacher backgrounds and the demands of policy (chapter 5), and teachers' practices as mediated by backgrounds and contexts (chapter 6). Finally, I discuss the results and implications for future research (chapter 7).

CHAPTER 1: REVIEW OF LITERATURE

The challenge of ensuring that every student has a highly qualified mathematics teacher has received considerable attention from U.S. scholars and policymakers concerned about U.S. economic competitiveness and the academic performance of American students relative to students in other countries (e.g., National Academy of Sciences, 2007, 2010; National Commission on Excellence in Education, 1983). Over the past three decades, many policies and studies aimed at addressing this challenge have adopted a labor market perspective and focused on increasing the supply of qualified teachers (e.g., Darling-Hammond, 2007a; Hirsch, Koppich & Knapp, 2001; Ingersoll & May, 2010; Liu, Rosenstein, Swann & Khalil, 2008; Lortie, 1975).

Scholars utilizing organizational approaches have challenged the findings of labor market studies (Cochran-Smith, 2004). For example, through extensive analysis of the Schools and Staffing Survey (SASS) and Teacher Follow Up Survey (TFS), Ingersoll (2001, 2002, 2003, 2004) and colleagues (Ingersoll & May, 2010; Ingersoll et al., 2014) have found that the primary challenge to ensuring that every child learns from a highly qualified teacher lies not in the supply of qualified teachers, but rather in the “revolving door” of turnover (i.e., the number of teachers who move to another teaching position or leave the profession).

Large proportions of teachers leaving the profession are novice teachers. In the United States, for instance, it has been widely reported that nearly half of all teachers leave the profession within five years of teaching (Ingersoll, 2003). More recent estimates indicate that 41.3% of the teachers leave before the five year mark (Ingersoll et al., 2014).

Compared to novice teachers in other content areas, novice *mathematics* teachers may be more likely to leave the teaching profession or move to schools with better working conditions. A common view among education researchers and policymakers (e.g., Murnane et al., 1991;

National Academy of Sciences, 2007; National Research Council, 2002) is that teachers with advanced math and science knowledge and skills often leave the teaching profession for positions in business and industry. However, more recent analysis of national data (Ingersoll & May, 2010) found that larger numbers of math and science teachers left for non-teaching jobs within the education sector than in private business or industry. Mathematics and science teachers remaining in the classroom did tend to move to more affluent, suburban schools with lower proportions of minority students (Ingersoll & May, 2010).

The tendency of teachers to move to more affluent schools with fewer minority students is also a common finding in education research. For example, in the early 2000s, several prominent studies of teacher turnover found that teachers working in schools serving students with low incomes and achievement were more likely to transfer or leave the profession than teachers working in schools serving students with higher incomes and achievement (Boyd, Lankford, Loeb & Wyckoff, 2005a; Hanushek, Kain & Rivkin, 2004; Scafidi, Sjoquist & Stinebrickner, 2007). The researchers concluded that teachers prefer to teach whiter, more affluent students.

However, another line of research focuses on the working conditions of schools as the driving force behind teacher turnover. Notably, studies from the Harvard Graduate School of Education's Project on the Next Generation of Teachers examine teacher retention through an organizational lens, but often include qualitative and longitudinal data (e.g., Johnson, 2004, 2006, 2012; Johnson, Berg & Donaldson, 2005; Johnson & Birkeland, 2003; Johnson, Kraft & Papay, 2012; Kraft, Papay, Charner-Laird, Johnson, Ng & Reinhorn, 2012; Simon & Johnson, 2013). A theme in these studies, and others (e.g., Allensworth, Ponisciak & Mazzeo, 2009), is that the poor working conditions often prevalent in low-income, minority schools – not student

demographics – drive teachers to move to more affluent schools. Furthermore, the school characteristics most important to teachers, and the best predictors of job satisfaction and intent to remain in the teaching profession, were largely social (e.g., collegial relationships, principal leadership, trust, respect, and openness) in nature (Allensworth et al., 2009; Johnson et al., 2012).

In the sections below I outline the method for conducting the study's review of literature as well as the results according to the research questions.

Method for Conducting Review of the Literature

To gather the literature cited in this study, I conducted a review of peer-reviewed journal articles, policy documents, book chapters, and reports from government and non-government organizations that addressed the role of teacher backgrounds, teaching contexts, and national and local educational policies on the socialization of middle school mathematics teachers with fewer than five years of teaching experience into the teaching profession in the United States.

Using focused keywords (e.g., middle school, mathematics, novice, teacher, accountability, retention) I systematically searched for and gathered sources from a range of databases, including EBSCOHost, ProQuest, JSTOR, Academic OneFile, Web of Science, and ERIC.

The research questions outlined above guided the literature search and helped to develop the analytical framework. Namely, what is the education policy context in Michigan and how is it reflected globally? What are the demands of state education policies on novice middle school mathematics teachers and how are they reflected in education contexts and teachers' practices? Finally, how do education contexts and teacher socialization mediate practices, efforts to teach diverse pupils, job satisfaction, and intentions to remain in the teaching profession?

Three criteria limited the literature review. First, since the No Child Left Behind Act of 2001 marks an intensification of the accountability movement and focus on teacher quality in the U.S., I chose to mainly review literature published after 2001.

Second, this study focuses on novice middle school mathematics teachers; therefore, when possible, I restricted the search to sources that included data from middle school mathematics teachers with five or fewer years of teaching experience as a teacher of record in a public secondary school, responsible for teaching an official curriculum according to official state standards.

Third, I sought studies that adhered to standards of the American Educational Research Association's (AERA) Standards for Reporting on Empirical Social Science Research in AERA Publications (2006). For example, quantitative studies of the influence of background characteristics, teaching contexts, and educational policies on teaching practices or the intent to remain in the teaching profession should include clear explanations of sampling procedures, measures and classifications, validity and reliability, statistical analyses used (and justification for appropriateness of these analyses), and the scope of generalization. Similarly, empirical qualitative sources had to clearly describe the process for developing claims, evidence for the claims, and how the author(s) arrived at the interpretation of evidence.

Literature Review Results

After reviewing the studies, I organized them according to categories related to the socialization and policy enactment frameworks and the research questions. While not an exhaustive review, the works cited are representative of the larger body of literature regarding education policy and novice middle school mathematics teachers.

Policy and Education Context

In recent decades, education systems in many countries (especially developed “Western” states) have been influenced by similar shifts in economic and social systems to a “market model” (Ball, 1998). The market model, Ball argued, shapes education systems by strengthening the linkages between national economic growth and schooling, employment, and productivity; focusing on student outcomes as measures of systemic success; reducing government expenditures on education; and enhancing community involvement through choice mechanisms.

Proponents of the market model assert that such models are necessary because governments lack the capacity to raise sufficient tax revenue for education; that privatization of education is efficient and equitable; and that accountability must be ensured and measured through standardized testing (Klees, 2008). At the global level, these arguments are propagated by organizations like the World Bank and the OECD (Akiba & LeTendre, 2009; Spring, 2015; Tatto, 2009) and are often couched in the language of crisis (Slater, 2014). In the Forward of the World Bank’s *Education Strategy 2020* report, for instance, Tamar Manuelyan Atinc (Vice President, Human Development Network) highlighted the “failure of education systems to prepare young people with the right skills for the job market [that has] fueled calls for greater opportunity and accountability” (World Bank, 2011, p. v).

The World Bank, and other advocates for increasing accountability in education, point to some countries’ persistently low student achievement scores on international standardized tests like the Trends in International Mathematics and Science (TIMSS) study and the Program for International Student Assessment (PISA) as evidence of education system failure. Since teachers are the school-level factor with the greatest impact on student learning (RAND, 2012; Rivkin et al., 2005), education reformers around the world are focusing on improving teacher quality (e.g.,

OECD, 2005). In fact, some reform advocates have argued that education systems are only as good as the teachers they employ and the student learning gains that these teachers elicit (e.g., Barber & Mourshed, 2007; Mourshed, Chijioke & Barber, 2010). Indeed, Bill Gates famously posited that if all students in the U.S. had “top quartile” teachers for one year, the difference on international achievement tests between the U.S. and Asian students would disappear (Gates, 2009). The simple solution, according to Gates, is to identify what “good” teachers do in the classroom and then implement policies to train other teachers to do the same.

This focus on teacher quality has given rise to a growing number of cross-national studies of teachers (e.g., Teaching and Learning International Survey [TALIS]) and the institutions that prepare them (e.g., Teacher Education Development Study in Mathematics [TEDS-M] and Assessment of Higher Education Learning Outcomes [AHELO]), which aim to help policymakers better understand and enhance the preparation and practices of teachers.

At the same time, policymakers in some countries point to countries with the highest scores on international student assessments and suggest that accountability mechanisms like teacher evaluations are essential for ensuring a quality teacher labor force and improving learning outcomes (Duncan, 2010). Proponents of such *performativity* (Ball, 1998) argue that adding teeth to teacher evaluations – in other words, tying teacher quality to student test scores, offering bonuses to highly ranked teachers, and dismissing low performers – will incentivize teachers to work harder, smarter, and more efficiently. In turn, increased teacher effort and knowledge will improve teaching practices, lead to greater student achievement, and ultimately contribute to economic growth.

According to some scholars, similar reforms across countries are evidence of a “world culture” of schooling (e.g., Baker & LeTendre, 2005; Meyer, Ramirez & Soysal, 1992). In this

view, schooling across the world is converging toward a common model with similar policies and practices (Chabbott & Ramirez, 2000). Given the strength of the “world culture” current, some have argued that “nations no longer have the freedom to formulate their educational policies in isolation” (Akiba & LeTendre, 2009, p. 6). Indeed, since the 1980s, policymakers in the United States have urged market reforms in the education system through influential reports like *A Nation at Risk* (National Commission on Excellence in Education, 1983), which claimed that a weak U.S. public education system threatened American competitiveness in the global economy. Like reform literature at the global level, the language of crisis has long been a part of reform arguments at the national level (Berliner & Biddle, 1995). For example, *A Nation at Risk* called for more rigorous standards that would block the “rising tide of mediocrity” in American schools and put students on a new trajectory of achievement comparable to other industrialized countries.

Two decades later, reports comparing the performance of the U.S. education system to the systems of “high-performing” countries continue to perpetuate the perception of an American education system in crisis (e.g., Barber & Mourshed, 2007; Klein, 2011; Mourshed et al., 2010). Over the years, this crisis narrative has fostered increased federal involvement in strengthening education accountability, characterized by (a) the use of standardized tests to measure and compare student performance across states, (b) the promotion and adoption of “world class” standards upon which students, teachers, and schools are evaluated, and (c) the implementation of a system of incentives and sanctions for students, teachers, and administrators linked to testing outcomes (Anagnostopoulos, 2009).

The development of educational accountability at the national level can be seen in the policies promoted by presidential administrations in recent years. For example, President George

H. W. Bush, identifying himself as the “education president,” encouraged the development of America 2000, a set of voluntary national content standards coupled with voluntary testing in three grades (Shipps, 2011). Under the Clinton Administration, America 2000 was changed into Goals 2000, providing federal incentives to states to develop standards and assessments, but without great success.

It was the administration of President George W. Bush that accelerated accountability in American education. During his administration, the U.S. Congress passed the No Child Left Behind Act (NCLB), which pushed the standards movement even further by setting high standards for both teacher accountability and student achievement, even requiring that all students reach proficiency in math and reading by 2014. In addition, NCLB required that every school set and meet annual test score goals or Adequate Yearly Progress (AYP), for subgroups of students. If schools did not meet goals for each subgroup of students, then they were considered to be in need of improvement, and ultimately failing (Darling-Hammond, 2007b). More recently, the Obama administration, through its Race to the Top program, also encouraged states to adopt higher content standards in order to win federal awards.

States across the country have responded by adopting the Common Core State Standards (CCSS), an initiative launched by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO) to develop new, more rigorous content standards in mathematics and English language arts. As of 2016, 46 U.S. states have adopted the standards. Increasingly, students across the country are being assessed based on these standards, and their schools and teachers accountable for demonstrated proficiency.

Since the early 2000s, teacher quality has also been a key component of accountability at the national level. The NCLB law, for example, required that all teachers in core academic

subjects be “highly qualified” by 2005 (Akiba & LeTendre, 2009). Highly qualified, as defined by NCLB, meant that teachers must be fully certified, hold a Bachelor’s degree, and be competent in their subject area and in teaching. States that failed to meet and report the proportion of highly qualified teachers working in their schools risked losing federal education funds.

Similarly, through the Race to the Top funding program, in which states competed for federal dollars, the Obama Administration promoted the implementation of rigorous teacher evaluation reforms across states. Specifically, the administration encouraged states to design annual teacher evaluations that took student achievement growth into account as a “significant factor” and use evaluation results “to inform decisions about staff development, compensation, promotion, tenure, certification, and removal of ineffective teachers” (Institute of Education Sciences, 2014, p. 2).

The intensified focus on standards, comparisons, and accountability at the national level has a strong influence on education policy at the state level as well. And like reform language at the global and national levels, advocates for education reform at the state level link their proposals to economic crises. For example, the annual *Michigan Achieves* report (Arellano et al., 2016) presents Michigan’s education system as a failure in comparison to other states in the U.S. Like the national reports cited above, this report argues that Michigan students are at a huge disadvantage in the global economy and that “Michigan’s efforts to date do not reflect a serious commitment to the hard work that’s needed to transform our public schools for students of every kind” (p. 4). Furthermore, the report serves as an example of Ball’s concept of *new managerialism* as it presents “business leaders” as having the answers to Michigan’s education

crisis, stating “it’s time for Michigan business leaders to help provide leadership in advancing a thoughtful, research-based agenda...” (p. 5).

As noted above, most states across the country have ostensibly responded to national policy incentives and sanctions in the way that the “world culture” theory would suggest. That is, most states are adopting the CCSS; identifying and labeling “underperforming” schools and students; and attempting to link teacher performance to student achievement outcomes. However, other comparative education scholars (e.g., Anderson-Levitt, 2003; Robertson, 2012; Samoff, 2012; Steiner-Khamsi, 2012) challenge this view and argue that while commonalities in schooling are evident across countries and states, closer examination of education practices reveals important local variations, and often resistance to the pressures of global forces in favor of increasing education accountability. For example, in response to the threat of losing federal funds for failing to ensure that all teachers were “highly qualified,” many states simply adjusted, or even lowered, their certification standards regarding teachers’ content knowledge (Akiba & LeTendre, 2009).

Despite the agency demonstrated by states in response to national policy pressures, policies aimed at setting higher education standards, and holding schools and teachers accountable to those standards through extensive evaluation, place significant demand on teachers. Novice teachers, in particular, may bear a greater burden than their more experienced counterparts as they attempt to adjust to a range of unfamiliar challenges. In the following sections, I discuss these demands as they are reflected in schools and teaching practices.

Demands of Accountability Policies on Novice Teachers

Since novice teachers disproportionately tend to work in low-resourced and low-achieving schools, the accountability demands placed upon these schools to improve student

performance disproportionately impact novice teachers. Furthermore, because mathematics is a routinely assessed subject, and a commonly compared indicator of student achievement, novice mathematics teachers perhaps bear an even greater share of the accountability burden in schools.

So, what are the specific demands of novice mathematics teachers? First, although Michigan requested and received a waiver from the AYP requirements of NCLB, the state implemented a system of School Accountability Scorecards that “incorporate many of the same student achievement measures used for determining AYP as well as a few new measures” (Michigan Department of Education, 2014a, p. 1). The scorecards are comprised of five components: student participation on state assessments, student proficiency on state assessments, student graduation OR attendance rates, educator effectiveness label reporting and teacher/student data link reporting rates, and school improvement plan reporting and school diagnostic reporting. Student subgroups are also still identified by the following categories: race/ethnicity, limited English proficient, students with disabilities, and economically disadvantaged. In place of AYP, Michigan adopted a color code to label schools’ annual performance, from green (highest) to lime, yellow, orange, and red (lowest).

In short, administrators and novice teachers in Michigan are responsible for ensuring that all students (regardless of the various challenges they may face) come to school, complete state assessments, and meet proficiency goals on those assessments. Furthermore, teachers must demonstrate their effectiveness in relation to student performance. Not meeting these responsibilities results in public reports of school failure in the least, and the possibility of state takeover if left uncorrected.

Meeting these responsibilities is no small task even for seasoned teachers and administrators, all the more so for novice teachers. In the following sections, I describe how such accountability policies are reflected in schools and teacher practices.

Reflection in schools. State-level accountability policies can influence schools in multiples ways. Yet research suggests that key influences include changes to curriculum, use of time, allocation of personnel, arrangement of professional development opportunities, teacher retention, school improvement debates and decisions, and the ways in which the purposes of education are understood (Malen, 2003). These changes can be categorized as changes to the structure of schooling, and the roles and perceptions of administrators and teachers. In the following paragraphs, I describe the influence of accountability policies in these categories and the ways in which they are mediated by school contexts and the actors within schools.

Structures. By structures, I refer to elements of schooling such as the arrangement of schedules or allocation of resources, which can reflect accountability demands. Research indicates that, in general, district and school leaders often work to align curriculum content to material included in standardized tests and structure teacher and student schedules in order to devote more time to teaching tested content (Malen, 2003). Administrators in disadvantaged districts and schools whose *situated*, *professional*, and *material* contexts (Ball et al., 2011) are characterized by low-achieving and low-income students, and lower levels of capital (Achinstein et al, 2004), are more likely to focus time and energy on tested content. For instance, in an analysis of the responses of administrators and teachers to the implementation of accountability policies in two high-performing and two probationary schools, Diamond and Spillane (2004) found that district and school leaders in the probationary schools redirected their focus and time to tested mathematics content and supporting only the students near the test cut scores in an

effort to demonstrate increased achievement. In another qualitative study of two urban high schools in Chicago that were under district sanctions, Anagnostopoulos and Rutledge (2007) found that school leaders responded to sanctions by altering the school schedule to introduce weekly staff development meetings, facilitating department-level curriculum work and instructional coordination, and attempted to re-focus teacher attention on test preparation.

Similarly, Coburn, Mata, and Choi (2013) illustrated the ways in which district-level policies regarding the implementation of new mathematics curricula resulted in the creation of new structures (e.g., planning meetings), roles (e.g., math coaches), and a focus that impacted teachers' social networks. The researchers pointed out that educational policy can interrupt or strengthen common forms of interaction among teachers (e.g., professional development), influencing how teachers talk to each other, what they talk about, and the opportunities they have to learn from each other.

Yet research suggests that administrators in disadvantaged schools tend to invest in professional development activities that advance the goal of increasing student tests scores, whether or not such activities are requested by teachers or seen as instrumental to their development (Malen, 2003). Indeed, Jennings and Bearak (2014) noted that “many studies find increases in instructional time spent specifically on test preparation in high-stakes contexts” (p. 382). Such efforts to “teach to the test” have been critiqued for excluding important content and artificially inflating student scores (Jacob, 2005).

Accountability demands can also incentivize more nefarious structural changes. Darling-Hammond (2007b) noted several studies demonstrating that school leaders may alter school structures to retain high-performing students and expel, encourage drop-out, or deny admission to those who may be low-performing. Similarly, Figlio and Loeb (2011) reported evidence that

some schools classify low-achieving students as having a learning disability in order to remove them from the pool of tested students. Other studies report that some schools under pressure from accountability demands even alter their meals (Figlio & Winicki, 2005) and discipline or suspension patterns (Figlio, 2006) to boost the performance of some students, while eliminating others.

Yet evidence indicates that other school leaders seek to “couple” organizational routines in schools with state and district accountability demands in an effort to standardize the content covered across their schools, better manage the usage of materials, and influence teaching strategies (Spillane, Parise & Sherer, 2011). Although other research points to administrators acting as buffers between accountability demands and the work of teachers, Spillane, Parise, and Sherer (2011) found that in the schools they studied, leaders altered organizational routines in ways that linked teaching practices and standards and assessments.

The shifting structures and routines outlined above may place a heavier burden on novice teachers than their more experienced counterparts. Berliner (2001), for example, explained that for novice teachers, “the commonplace must be discerned, the elements of the tasks to be performed must be labelled and learned, and a set of context free rules must be acquired” (p. 21). Yet novices often lack access to information and networks (Stanulis et al., 2007) to enable them to make sense of their responsibilities in these contexts.

Roles. In response to accountability policies, administrators may also alter teachers’ roles in schools (Malen, 2003). Administrators in low-performing schools, for instance, might designate some teachers as math coaches or specialists, or assign teachers additional duties like data collection and analysis, in an effort to enhance overall mathematics instruction, and thus student test scores. In this way, administrators can adopt the roles of what Ball et al. (2011)

called policy *narrators* and *entrepreneurs* by articulating a vision of the policy and arranging resources or altering the roles of others in ways that achieve policy goals.

Valli and Buese (2007) presented compelling evidence of this behavior. In an analysis of interview data from 150 teachers in 25 schools over a four-year period, the authors found that teachers' work increased, intensified, and expanded, and their roles became more regulated and controlled as their schools implemented high stakes accountability policies. Aligning curriculum to standards, analyzing student data, developing materials, tutoring, and learning and incorporating English as a Second Language strategies were just some of the tasks that administrators asked teachers in the study to complete. The authors argued that while most teachers may engage in some of these activities on a regular basis, the frequency and intensity of their work clearly increased over the course of the study.

Unfortunately, the expansion of teachers' roles may not be accompanied by additional support. Teachers in schools whose *material* contexts are characterized by lower levels of capital are less likely to have access to such support. In their comparison of advantaged and disadvantaged schools, Spillane and Diamond (2004) also found that teachers' roles were expanded in schools under pressure from accountability reforms (e.g., teachers were required to engage in data analysis), but that teachers in the disadvantaged schools had limited opportunities or support to understand or complete the task, let alone know how to put their findings into practice. Similarly, Brown (2015) found that cuts in public school funding contributed to a lack of support for novice teachers, who often teach in low-resource schools.

However, teachers (even inexperienced novices) are not without agency. Despite the fact that the policy enactment framework (Ball et al., 2011) describes novice teachers as manifesting the role of *receivers*, who "exhibit 'policy dependency' and high levels of compliance most of

the time,” they can also adopt the role of a resistant *critic* in response to the demands of accountability policies. Anagnostopoulos and Rutledge (2007), for example, found that efforts to alter the school schedule, facilitating department work and instructional coordination, and general focusing teacher attention on test preparation dissipated over time due, in part, to a mismatch between the policy prescription to incorporate reading into every subject and the content-specific structure of secondary schools. In short, mathematics teachers in the schools successfully resisted pressure to alter their roles as math teachers through the integration of reading skills into their mathematics content.

Perceptions. Finally, Malen (2003) argued that accountability policies can influence the ways in which administrators and teachers understand the primary purposes of education and how they ought to approach these purposes. Specifically, Malen cites a study by Corbett and Wilson (1991) in which educators shifted from seeing tests scores as just one educational outcome of interest to test results as the most important outcome. In a later study, Malen and colleagues (Malen, Croninger, Redmond-Jones & Muncey, 1999) found that in schools under accountability pressure, administrators and teachers told students on a regular basis to prepare for standardized tests and that the test should be their chief priority. Indeed, regarding novice teachers, Brown (2015) found that the concept of an effective teacher was increasingly seen through the lens of test scores; furthermore, Pogodzinski (2012) noted high frequencies of teachers in their first three years of teaching reporting interacting with their colleagues about “standardized testing.”

Evidence suggests that accountability policies can also shape the ways in which administrators and teachers perceive the best approach to improve education for their students. Malen (2003) argued that policies can become the template from which conversations about

educational improvement, in spite of the contrast of these policies with what educators expressed in private as the most important strategies for improvement.

Reflection in practice. The notion that policies impact the practices of teachers has been contested over the past three decades. During the 1980s and 1990s, several prominent policy implementation scholars suggested that the implementation of many education policies failed because educators lacked the will and capacity for policy implementation (Odden, 1991), policymakers couldn't "mandate what matters" (McLaughlin, 1987), and teachers behaved as "street level bureaucrats" by ignoring or altering policy intentions (Lipsky, 1980). These findings built on earlier work highlighting the autonomy of teachers to guide their own practice by closing the door on policy influences (Lortie, 1975).

Coburn (2004) illustrated a historical cleavage between the conclusions of scholars using sociological and institutional approaches to analyze policy implementation; the former, she argued, tended to see teachers as having considerable autonomy over decisions regarding their own practice, while the latter emphasized the limited agency of individuals in organizations that shape behaviors and norms. Yet Coburn reported empirical evidence of a middle ground between these two approaches; that is, she argued that teachers have "bounded autonomy" or the autonomy to make decisions that are constrained by their assumptions about teaching and learning and the broader contexts in which they work. These contexts shape the range of possible and appropriate responses to organizational influence and what "makes sense" in a teacher's particular context.

For example, Coburn's work built on research by Cohen and Ball (1990) on mathematics reforms in California in which the authors found that instructional policies were mediated by teachers' knowledge and beliefs about the subject matter and their own established practices.

Similarly, Kennedy (2005) argued that the education “reform problem” (i.e., the disparity between reform goals and the actual practices of teachers) was the result of policymakers’ narrow view of the work of teachers. While demonstrating that teachers’ knowledge, values, beliefs, dispositions, and circumstances were important factors in the implementation of reform, Kennedy also illustrated that on a daily basis teachers encounter a much wider array of decisions and concerns than policymakers’ reforms address. These concerns constrained teachers’ capacity to implement reforms as intended. In fact, while research indicates that novice teachers express a need for collaboration, connections, and information to further the development of their practices (Chubbuck, Clift, Allard & Quinian, 2001), classroom management (i.e., the multitude of decisions they must make at any given time) is often their primary concern (Stanulis et al., 2007).

Ball’s (1998, 2003) concept of *performativity* is relevant here in that he argued that “central to its functioning is the translation of complex social processes and events into simple figures or categories of judgement” (Ball, 2003, p. 217). *Performativity* is reflected in teaching practices in multiple ways and is perhaps best described by Wills and Sandholtz (2009). The authors argued that a standardization approach to teaching, in contrast to professionalism, is characterized by an emphasis on the “technical core of teaching” and the goal of equalizing learning opportunities for students. The same learning standards are applied to all students and decisions regarding curriculum and instruction tend to be centralized at the district or state level. Often the curriculum is supplied to teachers with recommendations for time allotted to each content area (e.g., pacing guides). This approach, the authors argued, tends to emphasize the transmission of a set of knowledge perceived as fixed by a teacher whose role is to effectively manage the class and cover the material in time. In addition, Willis and Sandholtz noted that

professional development opportunities for teachers tend to also concentrate on the technical aspects of teaching (e.g., training on implementing curriculum, using particular materials, etc.) and adopt “trainer-of-trainers” approach in which teachers instruct other teachers on the material covered in the workshop.

This standardization approach can, in fact, impact the ways in which teachers practice. For example, some scholars (e.g., Achinstein et al., 2004; Ogawa, Sandholtz, Martinez-Flores & Scribner, 2003) have found that policies that emphasize specific teaching practices, and that are linked to assessments, influenced the practices of teachers by narrowing the curriculum and their teaching strategies. Cohen and Hill (2000) argued that when content-focused educational policies for teachers overlapped with the curriculum and assessments for students, then both teaching practice and student achievement can improve, but that this condition was not often present. In their analysis of mathematics reform in California, for example, the authors found that in spite of the reforms most teachers held on to traditional teaching practices, even those who overtly embraced the reform ideals.

Teacher Socialization

To understand the experiences of novice mathematics teachers as they are socialized into the teaching profession, it is important to first understand the ways in which their demographic, educational, and professional characteristics influence their experiences. Research on teachers in general indicates that demographic (e.g., age), educational (e.g., knowledge), and professional (e.g., certification) characteristics can influence who enters teaching, the schools in which they choose to teach, and if or when they choose to leave the profession (Achinstein et al., 2004, 2010). In the following sections I highlight research in these areas.

Demographic characteristics. In terms of demographic characteristics, gender, ethnicity, and age are the most commonly cited in the literature.

Gender. Not surprisingly, women are more likely to enter teaching than men (Guarino, Santibanez & Daley, 2006; Henke, Chen, Geis & Knepper, 2000), a trend that has only strengthened over time (Ingersoll et al., 2014). In fact, the proportion of women in the teaching force increased from 67% in 1981 to 76% in 2012; the increase is largely concentrated at the secondary level, which was historically male (Ingersoll et al., 2014). The authors suggested several interpretations of this trend, including a decline in males entering the teaching profession, the opening of positions for women at the secondary and administrative levels, the overall increase of women in the workforce, and the fit of teaching positions for family life.

Many other countries also report high levels of gender inequality in the teacher workforce. For example, data from the 24 countries that participated in TALIS 2008¹ indicates that across the participating countries, 69% of novice teachers, on average, were female and no country reported gender equality in the profession (Jensen et al., 2012).

Just as women are more likely to enter the teaching force, they are also more likely to leave. In their meta-analysis of 34 studies, Borman & Dowling (2008) demonstrated that gender was the most frequently identified demographic characteristic used in the studies (19 of the 34) and that the odds of women leaving the profession are 1.3 times that of men. These results support earlier findings from Guarino et al. (2006) and Ingersoll (2001).

¹ Australia, Austria, Belgium (Flemish Community), Brazil, Bulgaria, Denmark, Estonia, Hungary, Iceland, Ireland, Italy, Korea, Lithuania, Malta, Malaysia, Mexico, the Netherlands, Norway, Poland, Portugal, Spain, the Slovak Republic, Slovenia and Turkey

Ethnicity. At the same time that more women are entering the teaching force, the overall number of minority teachers is also increasing (Broughman & Rollefson, 2000; Guarino et al., 2006). The increase in the number of minority teachers is supported by recent national efforts to increase the “number, quality, and diversity” of teachers in America (United States Department of Education, 2010). As of 2012, at least 31 states had also implemented a range of policies and programs to recruit and prepare teacher candidates from underrepresented populations (Villegas, Strom & Lucas, 2012). Minority teachers also exhibit interest in increasing educational opportunities for traditionally marginalized students by teaching in low-income, culturally diverse schools (Achinstein et al., 2010; Achinstein & Ogawa, 2011, 2012). However, although the overall number of minority teachers has increased, the proportion of minority teachers has not kept pace with increases in the proportion of minority students in the United States (Ingersoll et al., 2014).

Novice teachers’ race or ethnicity also influences their relationships with students. For instance, a growing body of research suggests that diverse teachers can serve as role models for marginalized students (Dee, 2005; Klopfenstein, 2005; Miller & Endo, 2005), are best positioned to understand and teach diverse students (Achinstein & Ogawa, 2011; Milner, 2006), often agree to teach and remain in “hard-to-staff” districts or schools (Achinstein, Ogawa, Sexton & Freitas, 2010), and perhaps most importantly, can improve the mathematics achievement and school experiences of marginalized students (Dee, 2004; Egalite, Kisida & Winters, 2015).

In terms of retention, white teachers are 1.36 times more likely to leave the profession than non-white teachers (Borman & Dowling, 2008), consistent with earlier findings (Guarino et al., 2006; Ingersoll, 2001).

Age. While the modal age of the overall teaching force increased over the two decades between 1988 (age 41) and 2008 (age 55), this trend appears to be over as the modal age in 2012 was 30 years (Ingersoll et al., 2014). Furthermore, the overall number of teachers over the age of 50 decreased by 170,000 between 2008 and 2012. At the same time, considerable proportions of novice teachers in the United States continue to enter the profession mid-career (Johnson, 2004). In 2012, for example, nearly one out of three new teacher hires was over the age of 29 and one out of ten were over the age of 40 (Ingersoll et al., 2014). Globally, one-quarter of all new teachers hired in OECD countries were under 25 years old and more than two-thirds (69%) were under 30 (Jensen et al., 2012).

Age also influences where teachers choose to teach. In a longitudinal study of 50 first- and second-year teachers in Massachusetts, Johnson (2004) found that some mid-career entrants are drawn to teaching because of an impression that the career would be family-friendly (e.g., it would allow them to keep a schedule similar to their children); for others, their working experiences prior to entering teaching underscored ways in which they wanted to use the skills they learned in their former profession to improve educational outcomes for students.

In terms of retention, one common finding in the literature is that attrition is higher among young novice teachers compared to more experienced teachers (Borman & Dowling, 2008; Guarino et al., 2006; Hanushek et al., 2004; Ingersoll, 2001). Also, teachers who entered the profession after age 31 are less likely to leave than teachers who entered the profession younger than age 30 (Borman & Dowling, 2008). This study also found that the odds of attrition among teachers who were having a child were 6.69 times greater than teachers not having a child. Yet, the number of children a teacher already had had no relation to their odds of attrition.

Educational characteristics. A candidates' knowledge (as indicated by academic performance) is another important influence on who enters teaching. A common perception in the past – supported by research – was that those who entered the teaching profession were academically inferior to those who entered professions like medicine, engineering, or law. For example, Guarino et al. (2006) concluded that college graduates with the highest measured knowledge, or ability, tended not to enter the teaching profession. Their conclusion was supported, in part, by research comparing the ACT scores of Missouri graduates who entered teaching and those who did not. The authors found that those who entered teaching had significantly lower ACT scores than those who did not enter teaching (Podgursky, Monroe & Watson, 2004). However, this gap was largely among teachers at the elementary level. In addition, in an analysis of Baccalaureate and Beyond data, Henke et al. (2000) found that students who scored in the top quartile on a college entrance exam were less likely to enter teaching than students who scored in the bottom quartile. However, more recent research analyzing multiple data sets from 2008 (e.g., Goldhaber & Walch, 2014) indicates that graduates with STEM majors who entered the teaching force had higher SAT scores than their counterparts entering other occupations. Finally, in their cross-national study of future mathematics teachers, Tatto et al. (2012) found that, on average, 66.5% of future middle school mathematics teachers in the U.S. fell below the first anchor point (i.e., lower levels of knowledge) and 97.9% fell below the second anchor point (i.e., higher level of knowledge) on measures of mathematical content knowledge.

As noted in the introduction to this study, compared to novice teachers in other content areas, mathematics teachers may be more likely to choose to teach in schools with better working conditions. For example, nationally, math and science teachers who remain in the teaching

profession tend to move to more affluent, suburban schools with lower proportions of minority students (Ingersoll & May, 2012). Research also suggests that they may be more likely to leave the profession. For instance, past studies of math and science teachers in Michigan (Murnane et al., 1991) found that teachers with advanced math and science knowledge and skills often leave the profession for positions in business and industry. These results are aligned with others that found that teachers with higher measured ability (as determined by test scores) had a higher probability of leaving the profession (Borman & Dowling, 2008; Guarino et al., 2006).

Since the implementation of NCLB, which required that every teacher be certified in their content area, have a four-year bachelor's degree, and demonstrate content knowledge in their subject, there is little variation in novice teachers' educational attainment upon entry into the profession. However, a growing number of novice teachers are entering the profession having received alternative certification (which I discuss more extensively in a later section), a term used to describe routes into teacher certification other than the traditional teacher preparation program. Due to the shortened nature of such programs, these teachers often have limited opportunities to engage in sustained coursework or student teaching (Humphrey & Wechsler, 2007).

Furthermore, they found that credentialed teachers were less likely to leave the profession than teachers without credentials. Also, teachers with math and science backgrounds were more likely to leave than teachers with other majors, especially at the secondary level (Guarino et al., 2006; Henke et al., 2001), findings which align with prior research (e.g., Murnane et al., 1991).

Professional characteristics. Previous research has highlighted gaps in the qualifications of teachers working in schools that serve low-income and minority students compared to teachers in more advantaged schools (Clotfelter, Ladd & Vigdor, 2005; Goldhaber, Choi &

Cramer, 2007; Lankford et al., 2002). An increasingly important gap is between teachers who obtained certification through a traditional teacher preparation program and those who obtained certification after completing an alternative certification program. For example, Cohen-Vogel & Smith (2007) observed that novice teachers with alternative certification were more likely to have worked outside of education and have a master's degree, but less likely to have any teaching practice or major in education. Other researchers have found that teachers with alternative certification report feeling less prepared to teach in their first year of teaching (e.g., Kee, 2012).

In addition to these findings, recent research indicates a “turnover gap” between alternative and traditionally certified teachers (Redding & Smith, 2016). The authors found that as of the 2007-2008 school year, the predicted turnover rates among alternatively certified teachers was 10 percentage points higher than traditionally certified teachers. Furthermore, even when controlling for teacher and school characteristics, Redding and Smith (2016) found “evidence of a positive and sizable turnover gap between early career AC and TC teachers” (p. 28). Since alternatively certified teachers are often recruited to fill needs in the most “difficult-to-staff” schools, this gap in turnover suggests disproportionate volatility in the staffing of disadvantaged schools. Linked to other research indicating that teachers who move to different schools tend to choose schools where the average teacher quality (as estimated by value-added measures) is most like their own (Feng & Sass, 2011), these findings underscore the impact of teacher mobility on achievement gaps between disadvantaged and minority students and their advantaged and white counterparts.

In addition to their certification, teachers' beliefs are important professional characteristics, specifically as they relate to student learning of mathematics. Education

researchers argue that beliefs serve “orienting” and “action-guiding functions” to build “a bridge between knowledge and action” and are important indicators of “teaching and student performance” (Schmidt et al., 2007, p. 14). Schmidt, Blomeke, and Tatto (2011) offered three categories of beliefs about mathematics: epistemological beliefs, beliefs about teaching and learning, and pedagogical beliefs. Epistemological beliefs about mathematics, according to the authors, fall into one of four categories: mathematics as a science of creative problem-solving, a science that is relevant for life, a science that is formal and logical, or a science that is essentially a set of rule or procedures. Beliefs about teaching and learning mathematics refer to teachers’ understanding of teaching as constructivism or transmission (Schmidt et al., 2011). Finally, the authors define beliefs about mathematics pedagogy as those regarding what students ought to learn and more “anthropological” questions such as whether or not mathematics is a fixed ability or that success in mathematics is related to gender or ethnicity.

The question of novice teachers’ beliefs about how mathematics is taught in the context of student diversity is another important professional characteristic. DeSimone and Parmar (2006), for example, illustrated that as teachers find themselves under increased accountability pressure to improve mathematics performance, even with students with learning disabilities, school administrators should be concerned with the lack of teacher knowledge about the learning needs of students with disabilities, the importance of teacher collaboration, and lack of teacher preparation for inclusion in teacher preparation programs and in-service professional development. Similarly, Kumar and Hamer (2012) presented a longitudinal analysis of attitudes of future teachers toward minority students and found that more than 25% of the sampled future teachers “explicitly endorse stereotypic beliefs about poor and minority students” (p. 173). Yet the authors also found that future teachers who believed that all students can succeed and that

they looked forward to working with diverse students were associated with “mastery-focused achievement goals.”

The influence of accountability policies is shaped by the interaction of teachers’ backgrounds and the contexts in which they teach. In the following sections I explore this interaction.

Teaching Context

Ball (1998) and colleagues (Ball et al., 2011; Braun et al., 2011) theorized that teacher contexts can be organized into *situated* contexts (e.g., setting and student population), *material* contexts (e.g., staffing and budgets), *professional* contexts (e.g., values and teacher experiences), and *external* contexts (e.g., policy pressures and responsibilities). Achinstein et al. (2004) similarly attended to the professional cultures of schools and the levels of human, social, cultural, and physical capital contained in a given school.

In addition, Ball and colleagues posited that within these contexts, policy actors adopted one or several of seven roles in response to policy demands, including *narrator*, *entrepreneur*, *outsider*, *transactor*, *enthusiast*, *translator*, *critic*, and/or *receiver*. In the following paragraphs, I engage literature within these categories (except *external* contexts, since it was covered in the education policy context outlined above) and consider associations with teacher background characteristics.

Situated contexts. In the U.S. the location in which a school is situated remains a major factor influencing the students that attend that school. That is, most students attend a school near their home. Therefore, a teacher working in a school located in a predominantly rural, white, lower-middle class community will likely teach rural, white, lower-middle class students. This is important since research indicates that novice teachers tend to choose to teach in communities

similar (and within close geographic proximity) to their hometowns (Boyd, Lankford, Loeb & Wyckoff, 2005b). This research suggests that teachers prefer to work in schools and communities with which they share similar social and economic characteristics, preferences that are consistent across level and content area. For example, Boyd et al. (2005b) found that 87% of New York novice elementary teachers in general, and 84% of novice math teachers, 81% of novice science teachers, and 84% of novice special education teachers, chose to teach within 40 miles of their hometown between 1999 and 2002.

At the same time, Michigan is an interesting case because since 1996 it is a “schools of choice” state in which parents are permitted to determine which school within a district that their children will attend or even choose to enroll children in other school districts (Michigan Department of Education, 2016a). Local districts in Michigan choose whether or not to participate in choice programs. However, when Michigan students change schools, they take the full amount of state education funding with them, a situation linked to increased competition among schools to attract and retain students (Arsen & Ni, 2012). Student mobility may alter the makeup of the student population in schools; for example, in an analysis of 3 million Michigan student records between 2005 and 2013, Cowen, Creed, and Keesler (2015) found that low-income, Black, and low-performing students were more likely than their counterparts to change schools. This poses a challenge for administrators and novice teachers alike as they work to attend to the learning needs of more challenging students. However, the average time that these students spent out of their home school was only three years, indicating substantial student turnover in schools, posing another challenge for educators as schools’ reputations and histories are constantly in flux (Braun et al., 2011).

According to Ball's policy enactment framework (Ball, 1998; Ball et al., 2011; Braun et al., 2011), schools can be defined by the student population; in addition, teachers and administrators often define themselves by the population. In other words, teachers working in schools serving advantaged, high-achieving students may adopt such labels and consider themselves as high-achieving teachers and administrators. These types of perceptions can shape the ways in which teachers respond to policy mandates. For example, as noted earlier, teachers and administrators who perceive their students as having limited ability may seek to artificially alter the pool of students taking standardized tests in an effort to boost proficiency scores (Darling-Hammond, 2007). In this way, administrators and teachers can act as both *transactors* by becoming "creative accountants and fabricators of policy responses" (p. 630) and *critics* by keeping "counter-discourses alive" (p. 632).

Teachers' background characteristics are important here as well. For decades, research promoting increasing the proportion of teachers of color in the teaching profession has noted challenges related to the "diversity gap" between students of color and their predominantly white teachers. Recently, for instance, evidence indicates disproportionate number of suspensions and expulsions among black students (Smith & Harper, 2015), despite the fact that they are a relatively small percentage of the student population. The authors of this report argue that novice teachers lack the experience and preparation to know how to effectively manage discipline in schools.

The *situated* contexts of schools and the challenges they pose to novice teachers are also related to the *material* contexts of schools.

Material contexts. The *situated* context can shape the *material* context by bounding the resources administrators and teachers have to work. Braun et al. (2011) referred to the *material*

context as including the physical aspects of schooling (e.g., buildings, technology, surrounding infrastructure, budgets, and staffing). The design of school buildings, they argued, can influence the ways in which colleagues from other departments interact, contribute to over-crowded classrooms, and lead to discipline problems as students move through congested hallways. Furthermore, a lack of infrastructure to support technology can challenge teachers' abilities to effectively teach their students if they plan to use technology in their lessons, but cannot consistently rely on its availability or condition. In the U.S. such conditions are disproportionately evident in the schools of low-income, minority students, a fact that education scholars have illustrated in detail over the years (e.g., Kozol, 1991).

The physical condition of the school context is also related to student achievement. Indeed, Uline and Tschannen-Moran (2008) presented a thorough review of literature linking student academic achievement to a range of school conditions, including quality of schools' age, air temperature and quality, lighting, acoustical control, design, and overall impression. In their analysis, they found that when learning took place in poor school conditions, teachers focused less on academics and were less enthusiastic about teaching than those in better resourced schools.

Perhaps most importantly, the *material* context of schools determines the budgetary limits within which administrators have to work when staffing their schools. Therefore, economically disadvantaged districts and schools are more likely to hire teachers lacking in experience, appropriate credentials, or preparation in rigorous teacher education programs. In contrast, districts and schools with greater amounts of capital have adequate resources to hire teachers with better qualifications (Lankford et al., 2002).

Achinstein et al. (2004) argued that since districts and schools with higher levels of physical capital (e.g., larger budgets and better facilities) are able, on average, to attract and hire the best qualified teachers, they tend to also have higher levels of human, social, and cultural capital to provide novice teachers with quality induction, mentoring, and professional development experiences, thereby influencing the socialization of novice teachers. Novice teachers working in schools with high levels of capital, for instance, may frequently interact with experienced and skilled policy *narrators*, *entrepreneurs*, and *enthusiasts* who are under less accountability pressure than administrators and teachers at low-capital schools, and able to shape novice teachers' perceptions of accountability reforms.

Achinstein et al. (2010) also argued that district and schools' levels of capital have important implications for teacher retention. For example, greater amounts of physical capital (e.g., teacher salaries) are related to reductions in the odds of teacher attrition in all of the studies reviewed by Borman and Dowling (2008) that included salary as a factor (e.g., Hanushek et al., 2004; Imazeki, 2004; Smith & Ingersoll, 2004). The human capital of teachers is also importantly related to teacher retention; for instance, Ingersoll (2001) found that a lack of competence among peer teachers in urban schools was related to leaving teachers' decisions to move. In terms of social capital, research indicates that teachers are more likely to continue teaching in schools where they have opportunities to collaborate with colleagues (Borman & Dowling, 2008; Johnson & Birkeland, 2003; Loeb, Darling-Hammond & Luczak, 2005).

Professional contexts. Braun et al. (2011) referred to the *professional* context of schools as including teachers' values, commitments, experiences, and how they deal with policies within schools. Substantial research evidence indicates that these factors are shaped through professional learning communities (PLCs) in districts and schools. For example, PLCs can

influence the ways in which teachers engage with opportunities to learn (e.g., professional development activities), their interpretation of educational reforms, and how they alter instructional practices in response to reforms (e.g., Coburn, 2001; Coburn & Russell, 2008; Gallucci, 2003; McLaughlin & Talbert, 2001). Strong PLCs can also establish the trust that is essential for teachers to take appropriate risks (Bryk & Schneider, 2002) and expose them to social networks that could provide opportunities to learn from more experienced colleagues (Frank, Zhao & Borman, 2004). Finally, as noted earlier, research indicates that the best predictors of job satisfaction and intent to remain in the teaching profession are largely social (e.g., collegial relationships, principal leadership, trust, respect, and openness) in nature (Allensworth et al., 2009; Johnson et al., 2012). Therefore, novice teachers who work in districts and schools that establish strong professional communities to support teachers' understanding and interpretation of reforms, establish trust and respect among colleagues, and engage them in social networks that enhance their practices are likely to remain teaching in those schools.

Talbert (2010) illustrated that the conditions under which PLCs are most likely to be effective include norms of collaboration, a focus on students and achievement, access to wide range of learning resources, and accountability for student growth. In these conditions, it is clear that PLCs influence novice teachers' socialization by providing opportunities for teachers to engage with policy *narrators*, *entrepreneurs*, *enthusiasts*, and *translators* (Ball et al., 2011). For example, to the extent that PLC members are aligned to the conditions of student achievement and accountability, they are likely to interpret and champion accountability policies, serve as embodiments of policy, and strive to communicate the benefits of accountability policies to other PLC members.

One way that novice teachers may be introduced to such communities in schools is through an induction program. Although historically, novice teachers have endured a “sink or swim” experience early in their careers (Johnson, 2004; Kardos & Johnson, 2010; Lortie, 1975), the proportion of all teachers reporting participation in a formal induction system has increased significantly in the past couple decades, from 50% of teachers in 1990 to 91% in 2008 (Ingersoll, 2012). These teachers report participation in a range of activities linked to PLCs such as regular conversations with administrators, regular meetings with a mentor, seminars for beginning teachers, and collaboration with colleagues. Despite the fact that there appears to be considerable variation in how these activities are conducted and the impact they have on teacher practices (Wei, Darling-Hammond, & Adamson, 2010), in an extensive review of the literature, Ingersoll and Strong (2011) found that novice teachers who participated in formal induction programs reported higher satisfaction, commitment, or retention; demonstrated improvement in teaching practices (e.g., engaging students, planning lessons, and using questioning strategies); and were linked to increases in student achievement. Novice teacher participation in formal induction and mentoring programs also reduced the likelihood of teachers leaving the profession (Borman & Dowling, 2008), findings supported by other reviews of literature (e.g., Ingersoll & Kralik, 2005; Strong, 2005).

Yet Talbert (2010) argued that while school leaders and teachers are often familiar with or support the research and benefits of PLCs in schools, they often engage in practices that undermine PLC development; disadvantaged schools, especially, tend to “fall short on the human, social, political, and material resources to develop these conditions of teachers’ work” (p. 557). Similarly, Braun et al. (2011) argued that *professional* contexts need not be “coherent and uncontested in schools” (p. 591). Contrasts, for example, can be seen between the policy

enactment of experienced and novice teachers and between departments. For example, in their case study of four schools, the authors found that novice teachers tended to demonstrate their understanding of policies in relation to the department in which they worked. In this way, they exhibited the role of *critic* in that when a policy seemed to threaten a particular department (e.g., mathematics), novice teachers in that department adhered to the “carriers of collective history” in their department in opposing the policy.

Contributions of this Study

While this study builds on the work cited above, it can be distinguished by its focus on four focus teachers working in challenging schools across Michigan, including interview data regarding teachers’ experiences learning to teach in the context of increasing accountability reforms and supplemented by FIRSTMATH data (Tatto, 2016) including classroom observations and teachers’ self-reports about their beliefs about teaching and learning mathematics, opportunities to learn and teach, and preparedness to teach mathematics topics. Through the lenses of policy enactment, socialization, and teaching practice frameworks, the analysis of these data offer an opportunity to explore the nuances of the experiences of novice middle school mathematics teachers and the ways in which teachers’ backgrounds and teaching contexts work to mediate teaching practices and policy demands, and influencing how they teach diverse students and their intentions to remain in the teaching profession.

In the next chapter, I describe the study’s analytical framework and methodology.

CHAPTER 2: ANALYTICAL FRAMEWORK

While labor market and organizational perspectives illuminate important components of the challenge of supporting and retaining teachers, they are unable to adequately incorporate the social aspects of novice teachers' experiences. Nor do they capture the ways in which educational policies at the (inter)national and state levels influence the work of teachers. Therefore, in this study, I draw upon the theoretical frameworks of Ball (1998) and colleagues (Ball et al., 2011; Braun et al., 2011) and Achinstein et al. (2004) to better understand Michigan's education policy context as a case of an global trend and how novice mathematics teachers are socialized into the profession of teaching (see Figure 1).

Policy Enactment Framework

Ball (1998) pointed to shifts in many countries (especially developed states of the “West”) from industrialized “Fordist” economic and social systems based on manufacturing, to “market models” in which the prosperity of individuals is linked to their capacity to trade their skills and knowledge in a global market. Underpinning these changes, Ball asserted, are five core ideas: neoliberalism, new institutional economies, performativity, public choice theory, and new managerialism.

Ball referred to *neoliberalism* as an “ideology of the market” that pits the unplanned and responsive market against the more inefficient bureaucracy of planned economies. For example, some have argued the public school system in the U.S. has failed to adequately prepare students with the knowledge and skills of the 21st century to compete in a “knowledge economy, and that policymakers should partner with the more efficient business community to develop these capacities (Partnership for 21st Century Skills, 2008). *New institutional economics*, in Ball's view, arrange individual and collective behavior in terms of choices made by rational actors,

citing “site-based management” and “school improvement” as examples of this concept in schools. *Performativity* denotes efforts by the state to guide education indirectly by “steering” through target-setting, accountability, and comparison. For example, accountability and teacher evaluation policies in Michigan and other states enable states to use comparisons of evaluation outcomes, and corresponding sanctions, to incentivize changes in teacher performance. *Public choice theory*, an important component of neoliberalism, posits that enhancing the power of consumers to make choices contributes to improvements in products and services through increasing competition. Indeed, by adopting “schools of choice” policies in which parents can enroll their children in schools outside of their neighborhood or district, Michigan policymakers assume that empowering parents to “vote with their feet” will compel schools to improve in order to compete for students. Finally, *new managerialism* refers to the theories and techniques of business management that focus on excellence being used in public institutions like schools. For example, school leaders might delegate some power to teachers through new roles and responsibilities (e.g., instructional coach), yet continue to hold them accountable for outcomes of these roles.

While these ideas, and the policies that reflect them, appear to influence schooling in most developed countries, Ball (1998) concluded that “not everyone has an equal ‘stake’ in the success of the new economic order;” instead, the “core-periphery structure of the global economy and global and national labor markets appears to be closely paralleled in the emerging ‘star’/ ‘sink’ school polarizations within ‘market-reformed’ education systems” (p. 120).

Yet Ball and colleagues argued that even within schools that ostensibly appear the same, or are identified with the same label (e.g., underperforming, disadvantaged, or “sink” schools), variation in context exists and shapes how policies are enacted (Braun et al., 2011). The authors

argued that policymakers and researchers must “take context seriously,” positing that four “contextual dimensions” – situated, professional, material, and external contexts – influence the degree to which schools have the capacity to “cope” with policy demands.

Situated contexts in this framework include factors such as the location, school history, and student population of the school. For example, the population of students attending a particular school can result in that school being defined in particular ways (e.g., disadvantaged). Furthermore, the authors argued, teachers and administrators may define themselves and their performance by their students. Thus, teachers in schools with low-achieving students may see increasing accountability demands as insurmountable burdens.

Professional contexts in this framework refer to teachers’ values, commitments, and experiences of policy enactment. The authors posited that novice teachers, for instance, have limited experience with which to frame responses to policy demands in schools and, therefore, tend to adopt a position of compliance.

Material contexts include staffing, budgets, technology, and infrastructure, which influence administrators’ capacity to recruit and retain quality teachers. As noted above, research in the U.S. indicates that working conditions are strong predictors of teacher retention and the limited resources have a direct influence on the quality of those conditions.

Finally, *external* contexts, namely accountability pressures and other legal requirements, influence how policies are enacted in schools. For example, as schools in many states are increasingly ranked in terms of student achievement, teachers in schools comprised of lower performing schools face greater pressure to enact policies aimed at increasing student achievement than teachers in schools comprised of higher performing students.

Of course, teachers and school administrators are not without agency in responding to policy demands within the contexts of their schools. Ball et al. (2011) argued that scholarly policy literature tends to view all actors in the policy process as equal, as both “receivers” and “agents.” The authors challenged this view by identifying seven kinds of policy actors found in schools and the ways in which they enact policy. *Narrators* package and present policies, providing vision to “move things along.” *Entrepreneurs* gather resources and persuasively promote certain policies in which they are personally invested. *Outsiders*, often consultants or other stakeholders, have interests in influencing internal school functions. *Transactors* monitor accountability data and enforce policy. *Enthusiasts* are those who “embody” policies, serving as examples for others. *Translators* seek to communicate policies to actors in and out of schools. *Critics*, obviously, critique policy demands. Finally, *receivers*, often the least experienced teachers, demonstrate “policy dependency” in that they generally seek to comply with policy demands.

This framework illuminates the ways in which education policies shape and are shaped by the school contexts and the teachers who work within them. With some overlap, the second theoretical framework highlights how these factors influence the socialization of novice teachers and their practices (see Figure 1 for a combined model of the two frameworks).

Teacher Socialization Framework

According to Achinstein et al. (2004), teacher socialization is how teachers “acquire the values and interests, knowledge and skills, and culture of the group” (p. 559). The framework describes how teachers’ backgrounds, the contexts in which they teach, and the policy environments in which they work shape the ways in which they are socialized into the teaching profession.

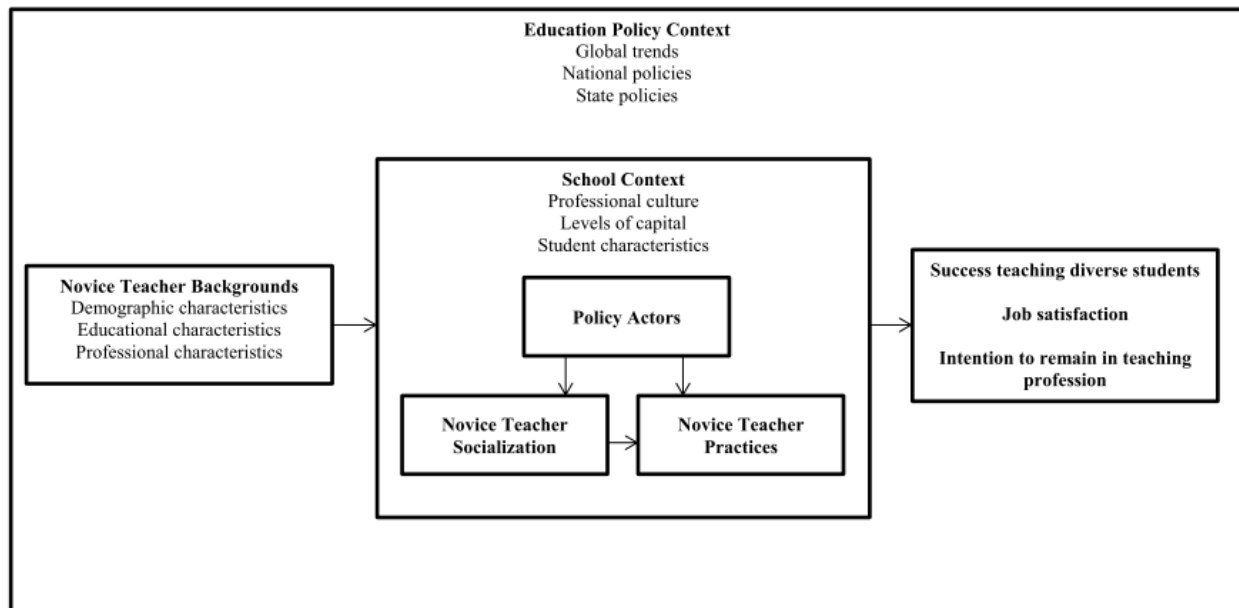


Figure 1. Model of Novice Teacher Socialization adapted from Ball (1998), Achinstein et al. (2004), and Michigan State University (2016)

Teachers’ backgrounds influence their socialization into the teaching profession in at least three ways: by (a) shaping their worldviews and cognitive frameworks, (b) guiding their selections of the schools where they work (and their relationships with students in those schools), and (c) outlining their “apprenticeship of observation” (Lortie, 1975). In line with this framework, the background of novice secondary mathematics teachers are also related to their beliefs about teaching and learning mathematics, their teaching practices, and their perceptions of teaching as a lifelong career.

Two key elements of teaching contexts influence teachers’ socialization into the teaching profession: professional culture and levels of capital (Achinstein et al., 2004). First, the professional communities into which novice teachers are socialized impact teachers’ beliefs and practices, the kinds of professional development opportunities available to them, and their retention in the profession. Second, Achinstein et al. (2004) argue that school districts have four types of capital – human, social, physical, and cultural – variations of which impact novice

teacher socialization. Human capital refers to the professional knowledge and skills of teachers and administrators in the district, and their approaches to learning and educational reform (Spillane & Thompson, 1997). Social capital is the value embedded in the relationships between colleagues (Coleman, 1988; Portes, 1998). For example, districts in which teachers trust their colleagues and have opportunities to collaborate can be seen as having high levels of social capital (Bryk & Schneider, 2002). Physical capital refers to financial resources, time, and materials. Finally, cultural capital refers to the access that students and their families have to cultural resources typically associated with privilege (Bourdieu, 1973). Together, these factors can have considerable impact on novice teacher development. For example, in schools characterized by high levels of capital, administrators have the funds to provide novice teachers with professional development opportunities led by knowledgeable experts within a network of skilled professionals and with the active support of parents.

In addition to teachers' background characteristics and the school contexts, national and state educational policies impact teacher socialization into the profession (Achinstein et al., 2004). Policies linked to assessment outcomes, for instance, have been shown to have an especially significant impact on teaching practice (e.g., Ogawa, Sandholtz, Martinez-Flores, & Scribner, 2003).

Teaching Practices

In addition to these frameworks, I consult Michigan State University's ASSIST for Beginning Teachers (Michigan State University, 2016) as a tool to analyze teaching practices. Developed by Teacher Education faculty at the university in partnership with the Michigan State Board of Education, Michigan Education Association, Michigan Elementary and Middle School Principals Association, and other Michigan education institutions, ASSIST identifies seven

categories of important teaching activity: *managing classes*, *engaging communities*, *planning instruction*, *leading discussions*, *assessing students*, *teaching content*, and *responding to students*. While it may seem that these topics should be rearranged so that *planning instruction*, for example, would come first, the order in which ASSIST arranged the topics seems to correspond with the most urgent needs of novice teachers. Therefore, I chose to retain the order. However, given a lack of sufficient data, I excluded the *engaging communities* and *assessing students* categories and combined the *leading discussion* and *teaching content* topics for this study.

According to ASSIST, *managing class* involves a range of tools, including establishing and teaching rules and routines, forming relationships with and among students, motivating students to learn, and dealing with behavior issues. ASSIST offers several tools for *planning instruction*, including long-range, unit, and daily planning. Since the teachers in this study were observed once, I chose to refer to daily planning strategies. One strategy, in particular, is a rubric for questioning the lesson's goals, the teacher's preparation, classroom management, and support provided to all learners. ASSIST's *teaching content* for middle school math includes tools for teachers to monitor interactions in the classroom, strategies for motivating student to learn mathematics, and organizing the classroom. Finally, *responding to students* presents teachers with a series of questions and tools to consider how to develop classroom community to value all students, plan to improve student achievement for all students, and motivate all students.

Complementing these four categories is research on mathematics teaching which, building on Shulman's (1987) concept of pedagogical concept knowledge (PCK), asserts that mathematics teachers need to know "mathematical knowledge for teaching" (Ball, Lubienski & Mewborn, 2001; Ball, Thames & Phelps, 2008), or mathematics pedagogical content knowledge

(MPCK) as defined by Tatto, Schille, Senk, Ingvarson, Peck and Rowley (2008). For example, in addition to mathematics content knowledge (MCK), MPCK involves teachers' abilities to present mathematical ideas and recognize and modifying or organizing tasks in response to student abilities.

Hypotheses

Through the lens of these frameworks, at least three key hypotheses are evident. First, novice middle school mathematics teachers will tend to adopt the role of policy *receiver* (Ball et al., 2011). Without the benefit of institutional memory and a history of experience in the politics of their particular school, and struggling to acclimate to the work of teaching within a new context, novice teachers are unlikely to engage in formal critiques of or resistance to accountability policies. Second, novice teachers with more and better preparation, whose beliefs are aligned with policy reforms and whose schools can provide meaningful professional development opportunities, will express greater success teaching a diverse population of students, higher job satisfaction, and stronger intentions to remain in the teaching profession. Finally, a gap exists between novice teachers' own backgrounds, beliefs, and perceptions of policies and what actually occurs in classrooms as they struggle to "manage" and "survive" during their first few years of teaching.

In the next chapter, I describe the methodology used to analyze these hypotheses.

CHAPTER 3: METHODOLOGY

The background data for this study come from a regional representative sample of secondary novice teachers of mathematics included as part of the larger cross-national field trial of the FIRSTMATH study (Tatto, 2016). The purpose of that study was to test the design, methods, instruments, and data collection procedures in preparation for a larger study (Tatto, 2015). Therefore, FIRSTMATH researchers surveyed a variety of teachers in a range of contexts at one point in time rather than repeated or longitudinal data as proposed for the larger study. Since the data used in this study is cross-sectional, and limited in terms of the information it can provide about novice secondary mathematics teachers across Michigan, my intention is to use this data as context for the in-depth interviews I conducted with four focus novice middle school mathematics teachers.

In the following sections, I outline the procedures for sampling the four focus teachers, describe this sample, present the research design, and describe the analytical approach.

Sampling Procedures

The four focus teachers were included in a regional representative sample of secondary novice teachers of mathematics in the cross-national field trial of the FIRSTMATH study (Tatto, 2016). At the middle school level, 13 novice mathematics teachers in 12 schools across 12 districts in nine counties in Michigan agreed to participate in the study. However, seven teachers in seven schools across seven districts in five counties² actually provided data. By far, the most common reason novice teachers gave for not participating in the study was a lack of time. Many noted that they were in their first or second year of teaching and felt too overwhelmed to try and

² Wayne, Ingham, Allegan, Bay, and St. Clair counties.

add one more task to their schedules. Others noted that they were taking graduate courses and didn't have time to participate.

For the four focus teachers at the core of this study, I purposively chose middle school teachers from the larger sample who (a) worked in schools characterized by economically and/or low-performing student populations, (b) were teaching in a range of districts across the state, (c) varied in terms of age and teaching experience, (d) varied in terms of teacher preparation, and (e) responded to prior requests to complete the entire set of project tasks (i.e., questionnaires, assessments, observations, and interviews).³ I contacted the four focus teachers via email to inquire about their interest in completing another round of the instruments and a follow-up interview about their perceptions of the accountability reforms they faced while learning to teach. The four focus teachers responded affirmatively and with support from the FIRSTMATH project, I arranged to visit their classrooms.

Description of Final Sample

The final sample of focus teachers comprising the core of this study consists of four novice middle school mathematics teachers that vary in terms of age, route into teaching, major, and years of experience who work in challenging middle schools in Michigan. Table 1 presents important background information of the four focus teachers. There are several differences between these teachers that are important to note. First, the teachers vary in terms of age; one teacher, in particular, entered the teaching profession later in life. The teachers also vary in terms of the teacher preparation programs, with two of the teachers completing a traditional four or

³ I should note that the FIRSTMATH Project offered participating teachers inducements for completing study instruments.

five-year university program and two completing post-graduate Master's degree certification programs.

Table 1
Description of Sample of Focus Teachers

	Stacey ⁴	Joan	Steve	Jillian
Age	27	43	25	25
Race/Ethnicity	White	White	White	White
SES	Middle	Middle	Middle	Middle
Route into teaching	Formal pre-service	Formal pre-service	Post-graduate	Post-graduate
Major	Math/Science	Education/Math	Education/Math	Education/Math
Years of experience	3	1	3	3
Grade level	7	6	8	7

Only one teacher differs in major, yet it is important to note that an education or math major in a post-graduate program may not include a comparable amount of coursework or experience to an education or math major completed as part of a Bachelor's degree program. The teachers differ slightly in terms of years of experience and grade level, but do not differ in their race and SES.

The schools in which these teachers work are challenging contexts for novice teachers

Table 2
Description of the Schools of Focus Teachers

	Stacey	Joan	Steve	Jillian
School location	Suburb	Rural	Rural	Suburb
Proportion disadvantaged students	High	Moderate	Moderate	High
Student proficiency	Low	Low	Low	Low

to learn to teach. Table 2 illustrates that all four middle schools are characterized by low student proficiency and at least moderate proportions of students are economically disadvantaged.

Importantly, the schools vary in terms of their locations. They are located in three main areas in Michigan: Wayne county in the southeast corner of the state, south central Ingham county, and

⁴ All teachers' names are pseudonyms.

St. Clair county on the eastern coast of the state. Furthermore, while two schools are labeled as suburban schools due to the populations of their districts, Stacey's school is located just a few miles from downtown Detroit and a casual observer would likely consider it an urban setting.

The teachers in this study were promised confidentiality, so I do not use their names or the names of their schools. As noted in the footnote above, all teachers' names are pseudonyms.

Instruments

The data I use as context for my interviews of these four focus teachers comes from the field trial of the FIRSTMATH Novice Teacher Questionnaire, Classroom Observation Protocol, and Pre- and Post-Observation Interviews instruments developed by Dr. Maria Teresa Tatto, Principal Investigator (Tatto, 2016) in collaboration with the FIRSTMATH researchers. Sections of the FIRSTMATH Novice Teacher Questionnaire were adapted from the instruments used in the TEDS-M study (Tatto, Rodriguez, Ingvarson, Rowley, Maeda, & Byun, 2013). In the following sections I briefly describe these instruments.

Novice Teacher Questionnaire

The Novice Teacher Questionnaire collects data from novice teachers in several areas. For the purposes of this study, I limited my focus to sections gathering information on teachers' (a) beliefs about the nature of mathematics, learning mathematics, mathematics achievement, and preparedness to teach mathematics; (b) opportunities to learn and to teach mathematics; (c) learning to teach and teaching mathematics; (d) perceptions about working in current school; and (e) general academic, demographic, and teaching background.

Classroom Observation Protocol

The Classroom Observation Protocol helps users to record a teacher's activities, the materials used, and who is involved in these activities throughout the observed lesson. It also

enables observers to describe the general flow of the lesson and the pedagogical strategies used by the observed teacher. Finally, the protocol includes holistic descriptions of the lesson's content, alignment with lesson plan, student/teacher interactions, and discussions.

Pre- and Post-Observation Interviews

The Pre-Observation interviews consisted of a series of questions to elicit information about the overall lesson plan, how it fit into the current unit, how it contributed to student learning of subject matter and the class objectives, the teacher's expectations for accomplishment and perceived likelihood of lesson success, and any barriers to success. Furthermore, it included questions about how the teacher prepared for the lesson, what the students had to do to prepare, and any aspects of the lesson that the teacher wanted the observer to understand about the class or the lesson.

The Post-Observation interview was comprised of questions regarding the outcomes of the lesson, how outcomes compared to teacher expectations, and any difficulties that the teacher may have experienced. It also addressed the participant's comfort level with the lesson content and pedagogy, the characteristics of students in the class, and the teacher's most urgent learning needs.

Follow-up Interviews

The three FIRSTMATH instruments just described provided data that help me frame the data I collected from teachers in the Follow-up Interviews. I conducted these Follow-up Interviews with the four focus teachers before the end of the Spring semester of 2015 in order to capture their experiences in the same school year in which they participated in the FIRSTMATH data collection.

I developed and revised the Follow-up Interview protocol in the Winter of 2015 in preparation for data collection in the Spring. The Follow-up Interview protocol included questions about the general experiences of teachers' work over the course of the school year, including any outstanding challenges in terms of management, subject matter, and pupils; their perceptions of an effective teacher; the accountability system under which they are evaluated; and their perceptions of the success of this system at measuring their effectiveness.

Research Design

This study is a case study of the experiences of a sample of four novice middle school mathematics teachers learning to teach under high-stakes accountability policies in Michigan. Yin (1994) argued that case studies are ideal when researchers seek to answer “how” or “why” research questions, lack control over the studied events, and analyze phenomena in a real-life context. All of these conditions are present in this study. For example, the research questions in this study ask how accountability policy demands are reflected in schools, classrooms, and teachers' practices. Furthermore, they ask how teacher socialization and school contexts mediate novice teachers' practices, how they teach diverse students, their job satisfaction, and intentions to remain in the teaching profession. In addition, socialization is a phenomenon that occurs in actual schools and classrooms, which researchers have no control over.

Thomas (2011) extended Yin's work by stating that the cases in case studies must be cases of something. More specifically, case studies need to include a clear *subject* and *object*. The *subject*, according to Thomas, is an example through which the “*object* can be refracted.” He further argued that the *subject* is essentially one of three types: local knowledge case of which the researcher has intimate knowledge, a key case that exemplifies the phenomena, or an outlier case. The *object* of the case study, then, is the phenomenon being analyzed. In this study, the

object under investigation is the policy enactment and socialization of novice secondary mathematics teachers and the *subjects* are the four focus teachers.

Finally, Ragin (1992) illustrated that instead of analyzing a few variables in a large number of cases, the case study approach allows researchers to examine the complexity of many factors within a few cases. Although the sample size of this study is small, I analyze data collected from the focus teachers with a broad range of instruments and activities. As noted above, the instruments included a questionnaire, observation protocol, as well as pre- and post-observation interviews, and follow-up interviews. Furthermore, the goal of case studies is not to generalize to a population in the statistical sense, but rather to generalize to broader theoretical frameworks (Yin, 1994).

In the following section, I describe how these instruments were administered and follow this description with the specific analyses I conducted on the data relative to each research question.

Administration of Instruments

The FIRSTMATH questionnaire data used as supporting context for this study was collected in November 2014 and FIRSTMATH teacher observations and pre-and post-observation interviews were completed in December 2014. I conducted the Follow-up Interviews with the focus teachers in May 2015.

Like most novice teachers, the participants in this study were incredibly busy completing a range of tasks: getting acclimated to their schools, planning lessons, teaching, meeting students, contacting parents, collaborating with colleagues, mentoring after-school clubs, and coaching sports teams. Given these hectic schedules, making arrangements to administer the FIRSTMATH instruments in person was difficult. As a result, FIRSTMATH researchers chose

to administer the Novice Teacher Questionnaire and Pre- and Post-Observation Interviews online. Below I briefly describe the administration of each of the instruments.

Novice Teacher Questionnaire. The Novice Teacher Questionnaire was administered to participants online. Teachers who agreed to participate received an email from FIRSTMATH researchers that included their unique ID number and clear instructions about how they could access and complete the instruments online. To access the instruments, participants were required to follow a unique web link and enter their unique ID number. After sending participants the initial email with instructions on how to access the instruments, FIRSTMATH researchers sent weekly reminder emails to those participants who had yet to access the instruments. Additionally, for those participants who accessed the instruments, but did not complete them in one sitting, FIRSTMATH researchers sent weekly reminder emails to encourage completion. According to IRB guidelines, all electronic data from the study were stored in password-protected systems known only to the FIRSTMATH researchers. Any physical data were stored in a locked room, to which only FIRSTMATH researchers had access.

Classroom Observation Protocol. For the focus teachers who agreed to be observed, FIRSTMATH researchers arranged to visit each classroom for an observation of one mathematics lesson of the teacher's choice. Upon arrival to the classroom, researchers greeted the teacher and asked him or her for a copy of the lesson plan. Then researchers found a seat from which they could observe the teacher without obstruction or student interruption. Before the lesson began, researchers quickly completed the cover page of the observation protocol. At the end of lesson they thanked the teacher and students for agreeing to the observation and for their contribution to the study. Any last-minute questions for the teacher were asked at this time. Finally, before leaving the building, researchers completed any unfinished notes about the events

of the observation, any additional teacher comments, and finalized marks on the observation protocol.

Pre- and Post-Observation Interviews. At least three days before each scheduled observation, FIRSTMATH researchers sent the Pre-Observation Interview questions to the teacher. The teacher then completed the interview questions online in time for the observer to review the responses prior to the observation. Within the same day as the observation, FIRSTMATH researchers sent the observed teachers the Post-Observation Interview to complete online.

Since participants answered the Pre- and Post-Observation Interview questions in an online format, asking probing questions during the interview was not possible; nevertheless, while participants' responses to interview questions varied in length and depth, in general each interview elicited two pages of text for a total of four pages of text from each participating teacher.

Follow-Up Interviews. In April 2015, I contacted the focus teachers to request their participation in a follow-up interview. As noted above, novice teachers, perhaps more than experienced teachers who are more accustomed to school and classroom norms, struggle to manage quite busy schedules. Indeed, novice teachers who declined to join the FIRSTMATH study cited a lack of free time as the chief barrier to participation. Therefore, arranging visits for the follow-up interviews was challenging and interviews lasted roughly 30 minutes. For the teachers who agreed to participate, I arranged the face-to-face visit and asked their permission to audio-record the conversation before conducting the interview. The interviews were semi-structured and included the topics outlined in the description of the instrument above. Throughout the interviews, I took general notes and tried to ask probing questions to ensure

understanding of the teachers' responses to questions. Immediately after each of the interviews, I completed any last minute observations or notes about the conversation that seemed meaningful. Also, as soon as possible after the interviews, I reviewed and transcribed the audio recording in an effort to identify early patterns in the data.

Analysis

In the sections below, I describe how I analyzed the data relative to each of the research questions. My analyses were guided by the policy enactment (Ball, 1998; Ball et al., 2011; Braun et al., 2011) and teacher socialization (Achinstein et al., 2004) frameworks outlined in chapter 2.

Policy and Education Contexts

The first research question in this study seeks to characterize the current policy and education contexts of secondary teaching in the state of Michigan and the ways in which these contexts are a case of larger national and global trends in education policy. To answer the first part of this question, I conducted a review of the major Michigan laws currently shaping or regulating the work of novice middle school mathematics teachers. This review included state policies regarding school accountability, standards reform, and teacher evaluation.

I use document analysis – an iterative process of content and thematic analysis (Bowen, 2009) particularly applicable to qualitative case studies (Yin, 1994) – to examine Michigan Department of Education policy documents (see Table 3). Through this process I illustrate the ways in which state education policy documents correspond to the five concepts that Ball (1998) argued undergird “market models” in education policy: neoliberalism, new institutional economies, performativity, public choice theory, and new managerialism. For example, Ball’s notion of *performativity* is especially relevant in thinking about accountability policies in Michigan in that the color coded “scorecards” used by the state to categorize school performance

correspond to what Ball (1998) calls “sign systems which ‘represent’ education in a self-referential and reified form for consumption” (p. 123).

Table 3

State Level Accountability Documents: Michigan

Policy Topic	Document
Standards	<i>Common Core Standards Fact Sheet – MDE</i> <i>Michigan K-12 Standards – Mathematics</i>
School accountability	<i>Michigan School Accountability Scorecards: 2014 “At-a-Glance” Overview</i> <i>2014 Michigan School Accountability Scorecards: Summary Characteristics</i> <i>2014 Michigan Schools Accountability Scorecards</i>
Teacher evaluation	<i>Public Act 173 of 2015</i> <i>Michigan Educator Evaluations At-a-Glance</i>

To answer the second part of the first research question, I again use document analysis and Ball’s framework to review key international education initiatives and reports (see Table 4) from influential multi-lateral organizations like the World Bank and the OECD to track and demonstrate the similarities between the conceptual underpinnings of these documents and policies governing education in Michigan.

Table 4

Key International Education Reports

Organization	Document
World Bank	<i>Learning for All: Investing in People’s Knowledge and Skills to Promote Development</i> <i>What Matters Most for Teacher Policies: A Framework Paper (SABER)</i>
UNESCO	<i>Education for All Global Monitoring Report 2000-2015: Achievements and Challenges</i>
OECD	<i>Teachers Matter</i> <i>Teachers for the 21st Century: Using Evaluation to Improve Teaching</i>

Demands of Accountability Policies on Novice Teachers

The second research question in this study seeks to identify the demands that state accountability policies place on novice mathematics teachers as they learn to teach and how these demands are reflected in schools, classrooms, and practices of novice teachers. For this and subsequent research questions, I engage in constant comparative analysis (Leech & Onwuegbuzie, 2007; Patton, 2002), a process involving coding chunks of interview data

according to themes from the analytical frameworks while also identifying emerging themes. I first use both policy enactment and teacher socialization frameworks to analyze follow-up interview, pre- and post-observation interview, observation, and questionnaire data to describe what Ball and colleagues (Braun et al., 2011) called the *situated, professional, material*, and *external* contexts of schools. In addition to interview comments from the focus teachers on these contexts, Table 5 presents supplemental FIRSTMATH questionnaire data used for this purpose.

To describe how policy demands are reflected in school contexts and teachers' practices, I analyze the same data using the concept of policy enactment outlined by Ball et al. (2011).

Table 5
Constructs and Indicators for Teachers' Reports of School Conditions, Teacher Interactions, and Limitations to Teaching from Students and Resources

	Construct	Measure /Indicator
School conditions	Teacher level of job satisfaction	
	Teachers' degree of success implementing curriculum	Very high
	Teachers' expectations for student achievement	High
	Teachers' perceptions of parental support for student achievement	Moderate
	Teachers' reported level of parental involvement in school activities	Low
	Teacher report of perceived students' desire to do well in school	Very low
Teacher interactions	Teachers' reported frequency of discussions with colleagues about how to teach a particular concept	
	Teachers' reported frequency of working with colleagues on preparing instructional materials	Daily or almost daily
	Teachers' reported frequency of visits to another teacher's classroom to observe his/her teaching	1-3 times per week
	Teachers' reported frequency of formal meetings with other mathematics teachers that discuss mathematics teaching and learning	2 or 3 times per month
	Teachers' reported frequency of formal or informal meetings with teaching mentors to discuss mathematics teaching and learning	Never or almost never
Limiting conditions from students	Teachers' reported limitations due to students with different academic abilities	
	Teachers' reported limitations due to students who come from a wide range of backgrounds	A lot
	Teachers' reported limitations due to students with special needs	Somewhat
	Teachers' reported limitations due to uninterested students	A little
	Teachers' reported limitations due to disruptive students	Not at all

Table 5 (cont'd)

	Construct	Measure /Indicator
Limiting conditions from resources	Teachers' reported limitations due to limited computer resources	
	Teachers' reported limitations due to shortage of textbooks for student use	
	Teachers' reported limitations due to shortage of other instructional equipment for students' use	A lot
	Teachers' reported limitations due to shortage of equipment for your use in demonstrations and other exercises	Somewhat
	Teachers' reported limitations due to inadequate physical facilities	A little
	Teachers' reported limitations due to high student/teacher ratio	Not at all

As noted earlier, the authors argued that school leaders and teachers adopt a number of roles within schools, including *narrators*, *entrepreneurs*, *outsiders*, *transactors*, *enthusiasts*, *translators*, and *receivers*. I identify and present evidence of these themes in the data and any contradictory evidence.

The Mediating Influence of Socialization and Context on Practices

Finally, the third research question in this study attends to the description of the mediating influence of teacher socialization (as expressed by teacher backgrounds and dispositions) and school contexts on practices and influence on teaching diverse students, job satisfaction, and intentions to remain in teaching. The teacher socialization framework (Achinstein et al., 2004) is important here as I analyze FIRSTMATH questionnaire data to develop descriptions of the teachers' demographic, educational, and professional characteristics.

Table 6 presents the main constructs and measures of these characteristics.

Table 6

Constructs and Indicators for Teachers' Reports of Demographic, Educational, and Professional Characteristics

Characteristic	Construct	Measure / Indicator
Demographic	Teachers' reported age	Age in years
	Teachers' reported gender	Female/Male
	Teachers' reported number of books at home	Number of books at home
	Teachers' reported frequency of speaking test language	Frequency of speaking language of test at home

Table 6 (cont'd)

Educational	Teachers' reported highest level of former education	Highest level of formal education
	Teachers' reported grades in secondary school	Grades in secondary school relative to peers
	Teachers' reported grades in teacher preparation program	Grades in teacher preparation program relative to peers
	Teachers' reported post-secondary major	Postsecondary major in math (Yes/No)
Professional	Teachers' report of another career	Another career before teaching (Yes/No)
	Teachers' reported teaching license	Teaching license (Yes/No)
	Teachers' reported reason for entering teaching	Relative importance of a series of reasons on entering the teaching profession
	Teachers' reported preparedness to teach	Relative preparedness to conduct a range of common teaching activities

The background characteristics gleaned from the FIRSTMATH questionnaire augment the analysis of the Follow-up Interview data, in which I use the frameworks to understand the relationships between teacher socialization, school contexts, and practices.

CHAPTER 4: POLICY AND EDUCATION CONTEXT

Before I present the analysis of the policy and education context in the state of Michigan, it is important to briefly describe a few key statistics regarding the state's geography, population, economy, and education system. Following the description of Michigan are sections analyzing education policy reform in the state. Specifically, I consider policies and reforms regarding standards, school accountability, and teacher evaluation.

Description of the State of Michigan

Covering 96,716 square miles (250,493 square kilometers), Michigan is the 11th largest state in the United States and the only state consisting of two peninsulas, the Upper Peninsula and the Lower Peninsula. It is the 10th largest state in terms of population with 9.9 million residents, the majority of whom live in the lower half of the Lower Peninsula. Major metropolitan population centers include Detroit (5.3 million), Grand Rapids (1.4 million), and Lansing (0.5 million). Manufacturing, government, and health care/social assistance are the major economic sectors of the state, and with a GDP of roughly \$408 billion in 2013, Michigan has the 13th largest economy in the United States (Stats America, 2016).

The State of Michigan includes 908 school districts and 3,464 public schools serving 1,564,114 students (Michigan Department of Education, 2015a) who are taught by 86,153 teachers (National Center for Education Statistics, 2015). Types of districts include 56 Intermediate School Districts (ISDs), 548 Local Education Agencies (LEAs), and 304 Public School Academies (PSAs). Of the total number of public school students in the state, 640,143 are eligible for free lunch and 84,197 are eligible for reduced-price lunch (National Center for Education Statistics, 2015), which are common indicators of low socioeconomic status. On average, pupil/teacher ratios in Michigan public schools were 23:1 in 2014, state aid to public

schools totaled \$11.5 billion, and per-pupil funding equaled \$7,400 (Michigan Department of Education, 2015a).

Education Policy Reform in Michigan

The following discussion of education policy reform guiding education within the thousands of schools across this diverse state is informed by Ball’s (1998) arguments that the “market model” of education, increasingly seen in countries and states around the world, emphasizes decentralization, strengthened linkages between schooling and employment, and engagement in comparisons of quality. Through analyses of key documents and reports, I highlight the evidence of these concepts in state-level education policies and the ways in which they align with global and national policy trends.

Standards

As of 2016, 42 states (including Michigan), the District of Columbia, four territories, and the Department of Defense Education Activity (DoDEA) have adopted the Common Core State Standards (CCSS), a common set of standards in mathematics and English language arts (Common Core State Standards Initiative, 2016). In some states these standards are a significant departure from the standards that guided education in the past. Regarding mathematics (CCSS-M), the standards “provide clarity and specificity rather than broad general statements” and “define what students should understand and be able to do in their study of mathematics” (Common Core State Standards Initiative, 2016, paragraph 5). The CCSS-M also aim to help students learn mathematical concepts in an organized manner and enable them to solve real-world problems.

The CCSS-M were preceded by content and process standards outlined by the National Council of Teachers of Mathematics (NCTM, 1989, 2000). The CCSS-M were also informed by

reports by the U.S. Department of Education’s National Mathematics Advisory Panel. The panel’s final report in 2008 stressed the importance of making the preK-8 mathematics curricula more coherent and focused; ensuring that children develop conceptual understanding; enhancing efforts to prepare and attract effective mathematics teachers; utilizing quality research in decision-making; focusing national and state assessments on pre-Algebra skills; and building capacity for rigorous educational research.

Analyses of Michigan Department of Education documents explaining the development and role of the CCSS in Michigan schools revealed alignment with Ball’s (1998) conception of the “market model” in U.S. education. In the sections below I outline these connections.

Decentralization. Ball (1998) argued that integral to the expansion of the “market model” in education is the devolution of school governance and the increase of community input on education decisions. First, the Michigan Department of Education’s (MDE) *Common Core Standards Fact Sheet* (Michigan Department of Education, 2014a) emphasized multiple times that the CCSS were not federally initiated. For example, the document articulated that the CCSS were “developed by states” and that the standards were “a state-led and state-driven initiative from the beginning” and “not developed or mandated by the federal government” and “was and will remain a state-led effort” (p. 2-3).

The *Common Core Standards Fact Sheet* also presented several examples of the ways in which the development of the CCSS was informed by multiple stakeholders. For example, the document noted that the CCSS were coordinated by the National Governors Association (NGA) and Council of Chief State School Officers (CCSSO) “alongside a wide range of educators, content experts, researchers, national organizations, and community groups” (Michigan Department of Education, 2014a, p. 1). More specifically, the document highlights the influence

of experts from Achieve, ACT, College Board, National Association of State Boards of Education, State Higher Education Executive Officers, American Federation of Teachers, National Education Association, National Council of Teachers of Mathematics, and the National Council of Teachers of English.

Finally, the *Common Core Standards Fact Sheet* emphasized that “teachers will continue to determine what curriculum and lesson plans best serve the needs of each classroom and each student” (Michigan Department of Education, 2014a, p. 3). At the same time, the *Fact Sheet* presents a theory-of-action that posits that as these teachers develop an “understanding of the increased rigor,” they will change their lesson plans to give their students opportunities to develop deeper knowledge in each standard.

The emphases in this document on state control, multiple stakeholders, and teacher empowerment represent the “magic” of the market model, according to Ball (1998). That is, it serves as a “hands off reform, non-interventionary intervention” in which policymakers are distanced from reform outcomes, yet continue to steer events from afar. The discussion of teacher empowerment perhaps best exemplifies this argument. On one hand, the *Fact Sheet* published by the MDE suggests that teachers will continue to use their professional judgement to determine the best curriculum and pedagogy for the unique needs of their students; however, on the other, it asserts that teachers “will” teach in certain ways. For example, teachers “will concentrate on teaching a more focused set of major mathematics concepts and skills,” “use rich and challenging mathematics content,” and “engage students in solving real-world problems” (Michigan Department of Education, 2014a, p. 3).

Linkages between schooling and employment. Solving real-world problems speaks to Ball’s (1998) assertion that an important component of the “market model” in education is

“tightening the connection between schooling, employment, productivity, and trade” (p. 122).

The CCSS themselves include a focus on “college and career readiness” that define what students should know and understand prior to graduation from high school (Common Core State Standards Initiative, 2016). Similarly, the *Michigan K-12 Standards: Mathematics* (Michigan Department of Education, n.d.) refer to “content required to be career – and college – ready.” In this context, real world problems can be seen as the tasks students are likely to encounter throughout their careers.

Additionally, state-level documents from key education stakeholders explicitly connect the quality of Michigan’s education system to its economic competitiveness. For example, the aforementioned *Michigan Achieves* report (Arellano et al., 2016) argued that the “underperforming” public education system in Michigan “threatens to undermine economic momentum and derail Michigan’s competitiveness for decades to come” (p. 3). Competitiveness is threatened, according to the authors, because the system is denying students opportunities to learn the knowledge and skills necessary to compete in a knowledge economy. Finally, as noted previously, the report presents “business leaders” as having the answers to Michigan’s education crisis, stating “it’s time for Michigan business leaders to help provide leadership in advancing a thoughtful, research-based agenda...” (p. 5).

These arguments correspond to what Ball (1998) called the influence of *new managerialism* in education. It can be recognized in the emphasis of a “cult of excellence” focusing on quality in public institutions and proposals for adopting the practices of business to enhance efficiency and effectiveness of education in service to a market economy. Furthermore, Ball argued that this process would be guided by an insistence on “target setting, accountability, and comparison” or *performativity* (p. 123).

Assessments and comparisons. Administering assessments and comparing results are the logical extensions of standards. In fact, the *Common Core Standards Fact Sheet* explained that a key rationale for developing the CCSS were the widely varying standards across states and a lack of assessments to measure student achievement against common standards. In an effort to develop new assessments, Michigan serves as a governing state in the Smarter Balanced Assessment Consortia (SBAC), one of two consortia developing student assessments based on the CCSS. Indeed, the SBAC claims that its summative assessments “accurately describe both student achievement...and student growth...to inform program evaluation and school, district, and state accountability systems” (Smarter Balanced Assessment Consortium, 2016).

As Ball’s (1998) framework suggests, the development of the CCSS and the assessments of student performance on the standards involved references to idealized states and countries that demonstrate high student scores on standardized tests. For example, the *Fact Sheet* states that “international benchmarking played a significant role” in the development of the CCSS. Furthermore, it states that standards were “informed by the standards of other high performing nations” and “have been built from the best and highest state standards in the country” (Michigan Department of Education, 2014a, p. 3).

While there is no common set of content standards at the global level, multilateral agencies and national governments often point to international assessments like the Program for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) as measuring the level of skills and knowledge necessary for success in the global workforce (World Bank, 2011). What these assessments measure, then, can be seen as the standards to which many countries aspire. For example, following the release of the 2009 PISA results, the U.S. Secretary of Education remarked that PISA was “fast becoming the

measuring rod by which countries...assess college and career readiness” (Duncan, 2010, para. 2). Furthermore, as noted above, state-level policymakers intent on reforming standards (i.e., CCSS) look to countries with high student PISA scores as examples of systems and standards to emulate as “solutions” (Ball, 1998) to low scores in their own countries.

Multilateral agencies are eager to promote such “solutions.” The World Bank, for example, stated in its most recent education sector strategy report (World Bank, 2011) that it will “focus on supporting reforms of education systems” including the “rules, policies, and accountability mechanisms that bind an education system together” (p. 5). Through support of particular kinds of reforms and reports that frame these reforms as the only possible path forward, organizations like the World Bank seek to establish what Ball (1998) called a “new orthodoxy” that limits what can be thought or what solutions can be seen. Increasingly, this orthodoxy, according to Ball, entails education policy solutions that encourage “survival of the fittest” in a global knowledge competition.

Assessments of student achievement have become a large part this effort. In fact, country participation in national and multi-national assessments has increased sharply in recent years. For instance, in 1990 12 countries administered national assessments, but that number increased to 101 countries in 2013, including developed and developing nations (UNESCO, 2015). Assessments have had an influence on national education policy. Indeed, most OECD countries have reformed their education policies “in direct response to PISA results” (UNESCO, 2015). As noted earlier, education reformers in Michigan frequently refer to these global trends in their adoption of the CCSS and corresponding student assessments.

School Accountability

The MDE has an extensive system for holding schools accountable for student performance. The department publishes a “scorecard” for each public school in the state, which combines student assessment data, graduation and attendance rates, and evidence of school compliance with state and federal laws (Michigan Department of Education, 2014b). According to the MDE, the scorecards serve to replace the Adequate Yearly Progress (AYP) mandate of NCLB per Michigan’s 2012 waiver from the obligations of NCLB. While the scorecards replace AYP, they “incorporate many of the same student achievement measures” as AYP “as well as a few new measures” (Michigan Department of Education, 2014b, p. 1). Specifically, five components comprise the scorecards: student participation and proficiency on state assessments, student graduation or attendance rates, educator effectiveness linked to student achievement, and reporting of school improvement plans (Michigan Department of Education, 2014c).

A school’s performance on these components is indicated by an overall color code system comprised of five levels. Green (the highest level) indicates that the school attained 85% or more of possible accountability points, lime (70%-85%), yellow (60%-70%), orange (50%-60%), and red (less than 50%). In addition to the overall color scorecard, each part (e.g., educator evaluations) has a separate color scale. For example, the student participation, educator evaluations, and compliance factors use a two-color (green and red) scale and the student proficiency, graduation rates, and attendance rates use a three-color (green, yellow, and red) scale (Michigan Department of Education, 2014b). According to the MDE, in 2014 3,361 schools received a scorecard: 36 purple, 50 green, 1,013 lime, 1,578 yellow, 203 orange, and 481 red (Michigan Department of Education, 2014c).

The color-coded accountability scorecards are examples of Ball's (1998) concept of *performativity* in that they serve as "sign systems which 'represent' education in a self-referential and reified form for consumption" (p. 123). In fact, the scorecards were developed with the explicit intent to give "schools, districts, parents, and the public an easy way to see a school's or district's strengths and weaknesses" (Michigan Department of Education, 2014b, p. 3). Providing accountability scorecards for the consumption of the public also exemplifies the role of *public choice* in accountability. That is, the scorecards present the public with ostensibly accurate information about their public schools with which they can make choices in terms of their own involvement in the system. Furthermore, as mentioned earlier in this study, since 1996 Michigan has been a "schools of choice" state in which parents are permitted to determine which school within a district that their children will attend or even choose to enroll children in other school districts (Michigan Department of Education, 2016a). Accountability scorecards, then, can directly influence how community members relate to local schools and potentially impacting the makeup of the student population in challenging schools and further depleting school resources as parents choose to "vote with their feet" and enroll their children in schools perceived to be better by the color of their scorecard.

While assessments of student achievement have many potential uses, many countries utilize the scores as a means of holding schools accountable for student performance. In many countries, this process involves comparisons to standards and the performance of other schools or systems. For example, nearly two-thirds (63%) of schools in OCED countries reported using student assessment outcomes to compare schools to district or national performance (OECD, 2013). More than half (53%) also reported using these scores to compare their school to other schools. Of course, there is substantial variation across countries. Only 17% of lower secondary

schools in Japan compared their schools to district or national performance, while 94% of schools in the U.S. did. Similarly, just 15% of Japanese lower secondary schools compared themselves with other schools while 86% of U.S. schools did.

These types of comparisons are also increasingly available to parents and other community members. In the U.S., for example, anyone can access the George W. Bush Institute's (2016) Global Report Card online to compare the average performance of students in their own school district to students in other states, the country as a whole, or a group of 25 developed countries. Comparisons across states and countries represent "relationships of accountability" between schools and consumers as advocated by the World Bank (2011), further evidence of the "survival of the fittest" approach to education reform (Ball, 1998).

At the national level in the U.S., many states requested and received waivers from the federal government from the school accountability requirements of NCLB, specifically the Adequate Yearly Progress requirements identified above. Yet, in their efforts to develop and implement new policies, states like Michigan adopted similarly rigorous accountability policies that identify "underperforming" schools, compare them to other schools, and provide accountability information to the public to facilitate choice.

Teacher Evaluation

The current iteration of teacher evaluation policy in Michigan – Public Act 173 (Michigan Department of Education, 2015a) – follows other recent efforts to clarify how Michigan teachers are to be evaluated. For example, in 2011 the state formed the Michigan Council for Educator Effectiveness (MCEE) to make recommendations to the State Board of Education, Governor, and state legislature regarding, among other things, a state evaluation tool for teacher evaluations (see MCEE, 2013 for final report). Some of the recommendations from

this report were included in Public Act 102 and the current Public Act 173, which requires that teacher and administrator evaluations be conducted annually and include student growth as a “significant component” (25% of the evaluation in 2015-2016, growing to 40% in 2018-2019) (Michigan Department of Education, 2015a). Furthermore, according to Public Act 173, teacher evaluations are to provide teachers with “timely and constructive feedback;” result in ratings of highly effective, effective, minimally effective, and ineffective; and are to be used to inform decisions regarding teacher and administrator effectiveness, promotion, retention, professional development, tenure, certification, and dismissal. For teachers in the first year of probation (whether a novice teacher or a teacher new to a particular district) or who received a rating of minimally effective or ineffective in the most recent annual evaluation, the law requires that administrators conduct a mid-year progress report. This report is intended to determine teacher improvement and to assist in their development and is based in part on student achievement; two classroom observations; a review of lesson plan, corresponding standards, and pupil engagement; and feedback for the teacher within 30 days (Michigan Department of Education, 2015a).

Teacher evaluations correspond to Ball’s (1998) concept of *new managerialism* in that they represent “both a delivery system and a vehicle for change” (p. 123). For example, the *Michigan Educator Evaluations At-a-Glance* (Michigan Department of Education, n.d.) document states that Public Act 173 “is a key strategy in our efforts to see Michigan become a top ten education state within the next ten years” (p. 4) Ball also argued that *new managerialism* stressed “constant attention to ‘quality,’ being close to the customer, and the value of innovation” (p. 123). Indeed, in just the one-page introduction of the *Michigan Educator Evaluations At-a-Glance*, the authors include multiple references to a “high-quality...education workforce,” “excellent educators,” “high-quality educator evaluations,” and “valid, reliable evaluation

systems” (p. 4). The “customers” of this quality system – students (and by extension, parents) – are mentioned early in the document through the explicit link between excellent educators and the improvement of student outcomes and lives. Finally, the value of innovation is evident in the argument that quality evaluations provide “actionable feedback and document ways to improve educational practice” (p. 4).

While naturally focused on the evaluation system itself, the *Michigan Educator Evaluations At-a-Glance* (Michigan Department of Education, n.d.) document acknowledges “educators’ personal pursuits of excellence” and argues that the system can facilitate such pursuits (p. 4). Ball (2003) argued that such representations of teachers are a key function of *performativity*. That is “teachers are represented and encouraged to think about themselves as individuals who calculate about themselves, ‘add value’ to themselves, improve their productivity, strive for excellence, and live an existence of calculation” (p. 217). Through such self-examination and improvement, the evaluation system suggests to teachers that they can improve their status in relation to others; that is, they can be outstanding, successful, or above-average by adopting the feedback they receive from evaluators (Ball, 2003). However, the presentation of Michigan’s teacher evaluation system assumes that the system will produce “valid, reliable, and fair” feedback and that districts and schools have the resources necessary to implement the system with fidelity. In fact, as Ball (2003) argued, often so much energy is expended on collecting performance information that little is left over for actually making improvements to practice.

The topic of teacher evaluation is also prominent in global conversations of education policy. Since teachers are the most significant school-related influence on student test scores and these test scores are used by states and countries to compare and compete in the knowledge

economy, policymakers are increasingly interested in enhancing teacher quality (OECD, 2005). Multilateral organizations have produced multiple studies and reports regarding teacher evaluation policies around the world (e.g., OECD 2013b; World Bank, 2013). These reports largely focus on the ways in which teacher evaluations can be used to identify strengths and weaknesses in teachers' practices and align professional development opportunities to improve teachers' performance. Yet, only 58% of lower secondary teachers surveyed by the OECD received feedback with suggestions for improving aspects of their work (OECD, 2013).

At the same time, more countries than ever are using student assessment data in the evaluation of teachers. In fact, between 2003 and 2012 the average proportion of students who attended lower secondary schools in OECD countries that used student assessment scores in their evaluation of teachers increased from 58% to 78% (OECD, 2013). In the U.S., 45 states have policies that require student growth in teacher evaluations, a policy promoted by organizations like the National Council on Teacher Quality (Doherty & Jacobs, 2015). As one of these 45 states, policymakers in Michigan are intent on increasing the role of student test scores in the evaluation of teachers.

Conclusion

Education policies in Michigan that reform content standards and hold schools and teachers accountable for student performance are supported by arguments in documents and reports that exemplify a market model of education (Ball, 1998). These reforms were not developed and adopted in a vacuum. Indeed, local and national education policymakers are often influenced by global education policy discussions and trends (Akiba & LeTendre, 2009). The analyses presented above suggest that the state-level education policies in Michigan reflect close

alignment with these global and national policy trends. Though well-intentioned, these policies place substantial burdens on novice teachers, a topic that I address in the next chapter.

CHAPTER 5: NOVICE TEACHER BACKGROUNDS AND POLICY DEMANDS

In this chapter I first introduce the focus teachers in this study by describing their demographic, educational, and professional characteristics before using analyses of these teachers' FIRSTMATH questionnaire and interview data to discuss the ways in which education policy demands are reflected in schools and practices. Indeed, how policy demands influence schools, and the ways in which teachers perceive and respond to them, can shape teachers' job satisfaction and intention to remain in the profession. The analyses are presented in accordance with Ball and colleagues' (Ball et al., 2011; Braun et al., 2011) framework of the *situated*, *professional*, and *material* contexts that explain variation in policy enactment in schools and the range of roles of policy actors within schools.

Introduction to Focus Teachers

Stacey is 27 years old and is in her third year of teaching, but the first year at her current school. According to her responses on the Novice Teacher Questionnaire (NTQ), Stacey grew up in a middle-class household and generally earned above average grades in secondary school and her teacher education program. She followed the traditional route into the teaching profession by completing a formal pre-service preparation program, where she majored in Mathematics and Science. According to its website, this program was a five-year teacher preparation program at a large public research university that led to secondary licensure (i.e., grades 6-12) in mathematics education. The program included a year-long classroom teaching internship and promoted the acquisition of deep content knowledge, teaching practices that are responsive to diverse populations of students, and skills of reflection and leadership. Students in the program had to also demonstrate proficient skills in using technology in the classroom. Prior to their teaching internship, students in this program must have earned a minimum GPA of 2.5, completed all

major and minor coursework requirements, and passed all components of the Michigan Test for Teacher Certification (MTTC). Finally, according to the NTQ, Stacey entered the teaching profession because she likes young people, feels she has a talent for teaching, and loves mathematics.

Joan entered the teaching profession later in life. She is 43 years old and is in her first year of teaching. According to data from the NTQ, she also grew up in a middle-class home and earned grades that were usually near the top of her class. Like Stacey, she followed the traditional route into the teaching profession by completing a formal pre-service preparation program, where she majored in Education and Mathematics. In fact, Joan completed the same program as Stacey, although at different times. Finally, Joan entered the teaching profession because she likes young people and wants to influence the next generation.

Steve is in his third year of teaching and is 25 years old. Contrary to the other teachers in this study, Steve reported growing up in a lower-middle class home and earned grades usually near the top of his class. He followed a non-traditional route into the teaching profession by completing a post-baccalaureate preparation program, where he earned a Master's degree and majored in Education and Mathematics. Steve completed this program at a small public university. Compared to the programs of the other teachers, fewer details about Steve's program were available on its website. However, the program claims to focus on developing teachers who value continual growth in knowledge and practice, have the capacity to provide important resources for students and parents, and are dedicated to developing strong relationships with the families and communities they serve. The home of this preparation program seeks to instill in its graduates characteristics of professionalism (e.g., strong content and pedagogical knowledge, attendance to achievement, and respect for students), collaboration, and critical reflection (e.g.,

development through evidence of the impact of practice). Finally, Steve entered the teaching profession because he felt he was a good student who likes young people and has a talent for teaching.

Lastly, Jillian is a 25-year-old woman in her third year of teaching. Like the other focus teachers, her self-reports on the NTQ indicated that she was raised in a middle-class home and reported that her grades in secondary school and her teacher preparation program were usually near the top of her class. Like Steve, Jillian followed a non-traditional route into the teaching profession by completing a post-baccalaureate preparation program, where she earned a Master's degree and majored in Education and Mathematics. Jillian completed her preparation program at a large, public research university where she joined a cohort of roughly 20 students for a four-term, 12-month program to secure certification to teach mathematics at the secondary level. This program website claims that it strives to produce effective and caring teachers and suggests opportunities to learn to teach underserved populations. This program also attempts to gradually expose future teachers to a diverse range of students and schools throughout the program as they work to develop their own teaching practices. For example, mid-way through the 12-month program, candidates work two days per week in a classroom; during the last three months they spend five days per week in a classroom. Prior to student teaching, candidates must pass the Professional Readiness Exam or demonstrate ACT test scores that meet exemption requirements (i.e., Reading = 22, Mathematics = 22, and English/Writing = 24). In addition, this program adopts a topic-oriented approach to teaching as opposed to a strictly course-oriented approach. In other words, instructors arrange for future teachers to study a range of interconnected topics across the duration of the program instead of isolated courses lasting one term. Finally, the

primary reason Jillian decided to enter the teaching profession was that she sees teaching as a challenging job.

Focus Teachers' Beliefs, Preparedness to Teach, and Opportunities to Learn

In addition to the demographic and educational background information outlined above, the teachers in this study responded to questions on the NTQ regarding their beliefs about learning mathematics, preparedness to teach mathematics, and opportunities to learn to teach mathematics to diverse populations of students.

Table 7 presents the focus teachers' reports regarding their beliefs about pupil achievement in mathematics. Teachers responded to a question asking them to report the degree to which they agreed or disagreed with specific beliefs about conditions for pupil achievement on a six-point Likert scale. In general, these reports indicated slight variation in teacher beliefs on a set of questions. Every teacher disagreed (whether slightly or strongly) that students needed a mathematical mind, ability is more important than effort, boys are better at math than girls, math ability is fixed, and that some people are naturally good at math while others are not. These are promising findings. If teachers agreed with any of these beliefs, for example, they might be less inclined – in the context of accountability demands – to devote time and energy to teaching groups seen as less capable of reaching proficiency (Darling-Hammond, 2007b).

With the exception of Stacey, the four teachers also demonstrated consistency in their responses. For example, Jillian disagreed with all of these beliefs, but expressed stronger disagreement that natural ability was more important than effort when learning mathematics. Joan also disagreed with this set of beliefs, but reported only slight disagreement that learners need a mathematical mind to do well in mathematics. In contrast, Stacey reserved her strongest

disagreement for the belief that certain ethnic groups are better at math and her weakest disagreement for the belief that some people are better at math than others.

Notably, every teacher except Steve expressed disagreement with the belief that some ethnic groups are better at math than others. While it is unclear which ethnic groups that Steve referred to, his report provides insight into his frequent references to his students as barriers to his success on teacher evaluations that rely in part on student assessment scores.

Table 8 presents the focus teachers' reports about their preparedness to engage in a set of typical teaching activities. The teachers responded to a four-point Likert scale question asking them to report the degree to which they were prepared to perform a list of teaching activities when they began their teaching careers. Compared to their beliefs, the teachers reported much greater variation in their feelings of preparedness. In general, the teachers' preparedness appears limited as well. For example, the only category in which most teachers felt prepared was working collaboratively with other teachers. Most of the four teachers felt ill-prepared to set up learning activities, use questions to promote higher order thinking, challenge pupils to engage in critical thinking, or manage classrooms effectively.

Perhaps the most notable element of the findings on preparedness is that the two teachers who earned their certification through post-graduate programs (Steve and Jillian) reported relatively lower preparedness to engage in these tasks compared to other teachers. While it is perhaps expected that teachers who were prepared in shorter preparation programs would report lower preparedness to teach, the fact that these teachers worked in schools serving some of the most disadvantaged students highlights an important teacher preparation gap. Jillian, especially, reported minimal preparation to engage in any of these key teaching tasks. For example, she reported no preparation at all to set up learning activities, promote higher order thinking, engage

pupils in critical thinking, or effectively manage her classroom. Furthermore, the school context in which Jillian taught offered limited opportunities for her to develop these skills.

Finally, Table 9 presents questionnaire data on the teachers' opportunities to learn and use strategies for teaching students with a range of diverse characteristics. Teachers responded to a question asking them to indicate whether or not they had the opportunity to learn (i.e., Learned or Not Learned) specific activities and whether or not they currently have the opportunity to do each activity (i.e., Yes, I do this or No, I do not do this) in the classroom. Considerable variation across the four teachers is evident. For example, Stacey reported learning half of the strategies, but used all of them in her teaching. Specifically, she did not learn strategies to meet the learning needs of students with behavioral or emotional problems, learning disabilities, or diverse cultural backgrounds, but must attend to the needs of these students in her work. Neither Joan nor Steve reported having to use strategies for which they had no opportunities to learn. Jillian, notably, reported only having the opportunity to learn strategies for working with poor or disadvantaged students, which she does in her teaching. However, some of Jillian's students certainly have different ethnic or cultural backgrounds, so it is interesting that she did not report using any related strategies for those students. One explanation for this could be Jillian's interpretation of the question; perhaps she only responded affirmatively for those groups of students for whom she had opportunities to learn and use her learning to teach those students.

Together, these findings have implications for teacher recruitment, job satisfaction, and intentions to remain in teaching. First, any teachers who agreed with beliefs that math is a fixed ability or that certain ethnic groups are better at math than others might make every effort to work in a school with limited diversity. Otherwise, for teachers holding such beliefs, working in

Table 7

Teachers' Agreement or Disagreement with Beliefs about Influences on Pupil Achievement as Reported on the FIRSTMATH NTQ

	Stacey	Joan	Steve	Jillian
Need mathematical mind	Disagree	Slightly disagree	Strongly disagree	Disagree
Natural ability more important than effort	Strongly disagree	Disagree	Strongly disagree	Strongly disagree
Boys naturally better at math than girls	Disagree	Disagree	Strongly disagree	Disagree
Math ability is fixed	Disagree	Disagree	Strongly disagree	Disagree
Some people good at math, others not	Slightly disagree	Disagree	Slightly disagree	Disagree
Some ethnic groups better than others	Strongly disagree	Disagree	Slightly agree	Disagree

Note. Possible responses included strongly disagree, disagree, slightly disagree, slightly agree, agree, and strongly agree.

Table 8

Teachers' Beliefs Regarding their Preparedness to Teach Using Specific Activities as Reported on the FIRSTMATH NTQ

	Stacey	Joan	Steve	Jillian
Communicate math ideas clearly	Slightly	Very	Somewhat	Slightly
Set up activities	Not at all	Somewhat	Slightly	Not at all
Use questions to promote higher order thinking	Slightly	Somewhat	Slightly	Not at all
Challenge pupils to engage in critical thinking	Somewhat	Slightly	Slightly	Not at all
Establish supportive environment	Slightly	Very	Not at all	Somewhat
Effective classroom management	Slightly	Very	Not at all	Not at all
Positive influence on difficult or unmotivated students	Not at all	Somewhat	Slightly	Very
Work collaboratively with other teachers	Very	Very	Very	Somewhat

Note. Possible responses included not at all prepared, slightly prepared, somewhat prepared, and very prepared.

Table 9

Teachers' Opportunities to Learn and Use Teaching Strategies in the Classroom as Reported on the FIRSTMATH NTQ

	Stacey		Joan		Steve		Jillian	
	Learned	Use	Learned	Use	Learned	Use	Learned	Use
Develop strategies for teaching pupils with behavioral and emotional problems		•	•	•	•	•		
Develop strategies for teaching pupils with learning disabilities		•	•	•	•	•		
Develop strategies for teaching gifted pupils	•	•	•	•	•	•		
Develop strategies for teaching pupils from diverse cultural backgrounds		•	•		•	•		
Accommodate the needs of pupils with physical disabilities	•	•			•			
Work with poor or disadvantaged backgrounds	•	•	•	•	•	•	•	•

a challenging school context might contribute to a teaching experience that is frustrating, ineffective for students, and leads to exit from the school or profession. Unfortunately, these kinds of experiences can be common for novice teachers (Brown, 2015). Conversely, novice teachers who strongly disagreed with the belief that certain ethnic groups are better at math than others might see teaching diverse populations of students as a social good and their reason for entering and remaining in the profession (e.g., Achinstein & Ogawa, 2011).

Second, the degree to which novice teachers feel (and are) prepared to teach students with a range of different learning styles in a variety of ways may influence the schools in which they choose to teach and their effectiveness working within those schools. While disparities between novice teachers' perceptions of preparedness and actual experiences in the classroom can be substantial (Johnson, 2004), some studies indicate that novice teachers who are well-prepared and hold strong initial commitment to the work of teaching are likely to persist in the profession (Guarino et al., 2006).

All of the novice teachers in this study worked in schools that many would consider challenging contexts. In the following sections, I describe these contexts using questionnaire and interview data collected from the novice teachers.

Policy Demands as Reflected in Schools

Ball and colleagues (Braun et al., 2011) argued that variations in policy impact on educators in schools is in part the result of variations in school context. The authors identified four contexts, specifically, that mediate policy impact: *situated*, *professional*, *material*, and *external*. Furthermore, the review of literature on the impact of policies in schools revealed changes to the structure of schooling, the roles and tasks of teachers, and perceptions of the purposes of education. Having discussed the *external* context in chapter four above, in the

following paragraphs I compare the experiences of the four focus teachers within the first three contexts.

Situated Context

First, the situated context refers to a school’s setting, including its history and the students who attend the school. Braun et al. (2011) asserted that educators tend to define their school by their students by constructing stories about their schools based on their own experiences, using, for example, phrases like “students like ours” and “our kids.” The authors stressed that they were not criticizing teachers for stereotyping their students, but rather illustrating that “context is an ‘active’ force” and not simply background information. The makeup of the student population, for example, can influence what strategies are implemented to meet policy demands. Furthermore, the ways in which teachers understand the student population can influence how those strategies are implemented and public perceptions of the school itself.

Here it is worth reproducing the table of the schools in which these teachers worked at the time of the study before presenting the experiences of the focus teachers.

Table 10
Description of the Schools of Focus Teachers

	Stacey	Joan	Steve	Jillian
School location	Suburb	Rural	Rural	Suburb
Proportion disadvantaged students	High	Moderate	Moderate	High
Student proficiency	Low	Low	Low	Low

Stacey. Stacey teaches 7th grade students in a public charter middle school designated as “yellow” by the Michigan Department of Education, indicating that it achieved at least 60%, but fewer than 70%, of possible accountability points in 2014. Compared to the other teachers, Stacey’s school was the most disadvantaged in terms of student achievement and socioeconomic

status. In fact, just 6% of the students were proficient in both mathematics and English language arts and nine out of ten (90.6%) were economically disadvantaged.

These disadvantages were reflected in the class of students that Stacey chose to be observed, where 29% of the students reported speaking another language at home at least some of the time and 71% reported having fewer than 25 books at home. However, 94% had a calculator and home computer. Nearly one in five students (17.6%) had repeated a year of school and 93.3% reported math grades at the same level or higher than their peers. Slightly more than half (56.3%) considered themselves to be good readers most of the time while slightly less than half (43.8%) reported liking math at least most of the time. Finally, 81% liked school at least most of the time.

Given that current Michigan accountability policies mandate that schools report on the proficiency levels in mathematics of subgroups of students (e.g., economically disadvantaged and English language learners) and not just the student population as a whole, Stacey was challenged by her particular population of students in striving to meet the demands of the accountability policies. For example, on the NTQ she reported that her teaching effectiveness was limited “a lot” by different student abilities. Furthermore, she highlighted student language, “home life,” and absences as key challenges for her:

Language is definitely a huge piece, especially here. Home life, how it affects their emotional well-being and behavior, and then absences. Language – having the time in class to meet with those students who you know are not understanding what you are saying or being able to read the directions on their own. Here we have some students who are Arabic and some who are Bengali. It’s not even like I could have someone who spoke Arabic come in and help, because I still have my Bengali students. Because there is the

language barrier, and they need one on one to be modeling – there is a lot of gesturing that occurs – and I can’t do that song and dance in front of the whole class. So, the time for that. (Stacey, April 2015)

Without the benefit of having received extensive preparation in the education of ELLs, like most novice teachers Stacey was challenged by meeting the needs of her ELL students. Indeed, Lucas, Villegas, and Freedson-Gonzalez (2008) have argued that most teachers in the U.S. lack the necessary preparation (e.g., coursework, professional development, or language training) for meeting the needs of ELL students. Stacey’s challenges were compounded by the fact that ELL students in her class spoke more than one language. In 2016, the Michigan Department of Education published a *Guidance Handbook for Educators of English Learners with Suspected Disabilities* (Michigan Department of Education, 2016b) to assist teachers of ELL students. This document stated that teachers of ELL students should implement one or more of the following strategies to assist ELL students: provide different or additional curriculum or instruction; change the classroom setting; allow the student more time; conduct additional observations and assessments of ELL students to understand their needs; and/or apply additional processes suggested by the student instruction team. Yet given that there is more than one language spoken by students, Stacey would have to supply a range of additional supports for students from each language family. Essentially, these requirements equate to substantial increases in the roles and tasks that novice teachers must fill and complete. That is, not only do they need to ensure their own knowledge and skill to effectively convey the content of the curriculum, but also take on the role and tasks of interpreter for students with limited language capabilities. As a novice teacher in her first year at her current schools, Stacey had to acclimate to a new school, students, and community, while also teaching to new standards and filling such

roles. A lack of time to engage in the suggested extra tasks for teaching ELL students could be one reason why Stacey placed this population of students at the top her list of challenges.

In addition to the challenges Stacey experienced as a result of attending to the needs of her ELL students, she expressed challenges related to her perceptions of students' home lives and associated absences:

Home life – for students who come in and whether they ate at home or mom or dad were there or who was taking care of them, whether they saw something the night before that was devastating and then having to come in the next day to school and have to deal with all of the expectations that are unloaded on them by teachers. Absences – when I have students that are out – they are often out one or two days every week. You still have to assess them when you know they didn't get the content. I have several students who I have never given a quiz to because they have missed so much. I have to individually meet with them and it is based on the dialogue that we have instead of taking a quiz for me.

(Stacey, April 2015)

While Stacey's description of students' home lives may be an overgeneralization, given that nine out of ten students at her school were defined by the state as economically disadvantaged, it is not surprising that some of her students lack nutrition. Whether or not these students "saw something devastating" at home, they did have to "deal with all of the expectations" that teachers "unloaded" on them. In this statement Stacey seemed to express both concern for the burdens borne by her students at school as well as frustration for her lack of knowledge about how to minimize these burdens. For example, she noted that even when students were chronically absent, she had to assess them, even knowing that they had no chance to learn the content. Stacey's experiences are similar to those of the novice teachers in Johnson's

(2004) work, who expressed uncertainty about their role in addressing the social and emotional needs of their students in addition to their capacity to effectively meet their academic needs.

Joan. Joan teaches 6th grade in a public middle school that is designated by the Michigan Department of Education as a “Focus” school. In other words, this school is within the 10% of public schools in Michigan with the largest achievement gaps between the top 30% and bottom 30% of students, based on average scale scores. Slightly less than half (45%) of the students in this school are economically disadvantaged and 19.6% are proficient in mathematics and English language arts. In addition to its status as a “Focus” school, the Michigan Department of Education identified this school as yellow on the state “scorecard,” indicating that it achieved at least 60%, but fewer than 70%, of possible accountability points. Furthermore, the school is not meeting any targets in terms of improving the mathematics scores of students with disabilities and students in the bottom 30% of the achievement distribution.

Compared to Stacey’s observed class, the students in Joan’s class had fewer disadvantages. For example, 93% had a calculator and 96.6% had a home computer. Still, 86% reported always speaking English at home and 71.4% had fewer than 100 books at home. One in ten students had repeated a year of school and 69% reported math grades at least as high as their peers. Finally, 62% claimed to be strong readers most of the time, 48.3% reported liking math most of the time, and 51.7% liked school most of the time.

Joan felt that several factors limited her effectiveness in the classroom; yet her comments focused on challenges related to students’ differing abilities and, specifically, students with emotional impairments (EI). During her follow-up interview at the end of the school year, Joan was still struggling to address the diverse learning needs of her students:

This class gets very distracted, even the higher kids. They say I've got it already, or they check out entirely because I keep going over this and over this so that the lower kids have a chance to get it. That is a challenge. We have two EI kids – three EI – and one who should be EI. Real behavior issues, like sometimes when they walk through the door. Today was relatively good. An autistic kid who was de-certified last year. Still autistic, but de-certified so he has no support. Some of the kids should be certified in something, but they are not. Some of them are super low and struggle with basic math concepts and they have behavior issues. This class has been a struggle. It has. (Joan, April 2015)

While most teachers who complete a teacher preparation program are likely familiar with the need to differentiate instruction for the range of learners they encounter in classrooms, Joan seemed to argue that the range of student abilities in her classroom was beyond her capacity to address. Just as many novice teachers lack preparation for teaching students with a range of linguistic challenges, Mihalas, Morse, Allsopp, and McHatton (2008) argued that most U.S. teachers lack the preparation necessary to effectively teach the growing numbers of students with emotional and behavioral disorders. In addition, the authors asserted that the context of high-stakes accountability has only exacerbated the development of one-size-fits-all approaches to teaching and school climates that make it challenging for teachers to address the needs of students with these disorders. Indeed, in a context in which her school was publicly identified as not meeting any state targets in terms of improving the mathematics achievement of students with disabilities, Joan expressed difficulties keeping both the “higher” and “lower” kids engaged in the lesson due to the need to continually re-teach for the benefit of the students with lower abilities.

At first glance, Joan's insistence that certain children in her class ought to be classified as EI students comes across as simple stereotyping. After all, she does not have the professional background to make such determinations. As noted earlier, research on the impact of accountability policies in schools has shown how some administrators and teachers classified students as having learning disabilities in order to remove them from the pool of tested students. Yet, from Joan's perspective, when considering policy demands that increasingly hold teachers responsible for the success of all of their students, her interest in labeling makes some sense. A student identified as EI, for example, would be entitled to additional classroom support that could assist Joan in addressing his or her unique learning needs. The lack of such support only posed additional challenges to her effectiveness. As she noted, she had one student with autism who lost support as a result of being de-certified.

This lack of support had direct impact on Joan's ability to arrange and teach her class in the way that she felt would be best for her students:

If we could work with these kids 10 at a time, that would help a lot. One of the things I have wanted to do is have small groups, but I would need to have special ed support in here, like the whole time, and I don't have that. So, that has been a source of frustration. So, it's like trying to put on a magic show up here to keep their attention. (Joan, April 2015)

Again, Joan referred to the level of support that she felt she would need to effectively teach this class of students. The lack of that support was a source of "frustration" for Joan, especially in the context of increasing accountability for helping all students reach proficiency. Finally, like Stacey who described her efforts to meeting the different abilities of her students as a "song and dance," Joan described her efforts as a "magic show." Both of these descriptions

suggest situations in which the “performer” has practiced and sought to perfect a performance, but has limited capacity to ensure that the “audience” even wants to see the show, let alone wants to engage in the act.

Steve. Steve teaches 8th grade in a public charter middle school also designated yellow by the Michigan Department of Education, indicating that it achieved at least 60%, but fewer than 70%, of possible accountability points. Twenty-one percent of the students at this school are proficient in mathematics and English language arts and 58% are economically disadvantaged. Furthermore, this school has not met any of its goals in terms of increasing the mathematics achievement scores of students in the bottom 30% of the achievement distribution.

Steve’s observed class reported that over half (54.5%) spoke English at home all of the time and an additional 36.4% spoke the language at least some of the time. Compared to the classes of the other three focus teachers, Steve’s students were more affluent. For example, 72% of the class had more than 100 books at home and all of them had a calculator and home computer. None had ever been retained a year in school and 80% claimed to have mathematics grades about the same as their peers. Two-thirds considered themselves to be strong readers most of the time and 77.8% liked math most of the time, but only 33.3% liked school most of the time.

On the Novice Teacher Questionnaire, Steve reported several factors that limited his teaching effectiveness, including different student abilities, range of student backgrounds, students with special needs, uninterested students, shortage of textbooks, and shortages of student equipment. However, in the follow-up interview, he highlighted challenges related to students’ lack of respect for adults and the role of competition in limiting his school administrators’ ability to address student behavior. Regarding students, Steve noted the following:

Their attitude and respect towards adults has changed, even since I was in high school.

You hear about it all over, not just here. My wife is a teacher too and she talks about how there is not that respect for adults anymore. Kids feel like they can say what they want and get away with it. (Steve, April 2015)

The challenges that Steve faced in his classroom differed from the other focus teachers in that his students were not characterized by some of the more extreme attributes (e.g., poverty, lack of nutrition, learning disabilities) found in the classes of the other teachers. Yet, like the challenges identified by the other teachers, Steve seemed to express a similar lack of capacity to meet his challenges. That is, just as poverty and learning disabilities may seem like insurmountable challenges to the other teachers, so too can students' "attitude" and "respect" toward adults. Steve's concern with students' perceived lack of respect for adults echoes the sentiments expressed by novice teachers in prior studies. For example, a novice teacher in Johnson's (2004) study reported that "there's very much a feeling [among students] like 'We're the ones that should be able to say what we want in [school]'" (p. 75). In addition, this teacher expressed that she was "blown away" by "the way [students] talk to each other and to adults" which made it difficult for her to engage students and maintain order in the classroom (p. 75).

Interestingly, Steve points to the policy context of competition between schools as limiting teachers' capacity to overcome students' attitudes.

That goes along with the support schools have from administration. They are scared to do anything to these kids because they are afraid that the parents will come back. Especially in this kind of school where you are trying to make sure that you are meeting your numbers, so you don't want to upset parents and have them go elsewhere. (Steve, April 2015)

In this comment, Steve referred to Michigan as a “schools of choice” state in which parents have the opportunity to enroll their children in schools other than the ones closest to their homes. In this context, schools increasingly must compete for students to sustain the amount of funding necessary to keep schools functioning. Indeed, charter schools like Steve’s must attract and recruit students in an effort to “meet” their “numbers.” Steve points to the fact that this policy context directly influences the capacity of administrators and educators at his school to even attempt to discipline students. In a way, the schools of choice policy context may alter Steve’s perception of the purposes of education. Similar to Brown’s (2015) findings that novice teachers working in high-stakes accountability contexts increasingly viewed their teaching through the lens of testing and test scores, these findings suggest that Steve may have viewed at least one of the purposes of education in this context as sustaining a stable level of “customers” for his school.

Jillian. Jillian teaches 7th grade in a public charter middle school that is also designated as yellow by the Michigan Department of Education, indicating that it achieved at least 60%, but fewer than 70%, of possible accountability points. Just 3.2% of students in this school are proficient in mathematics and English language arts and 74.3% are economically disadvantaged. Furthermore, this school has not met any of its goals in terms of increasing the mathematics achievement scores of students in the bottom 30% of the achievement distribution.

All of the students in Jillian’s observed class reported speaking English at home; however, only 15.8% had more than 100 books at home. Eighty-four percent had a calculator and all had a home computer. None had ever been retained a year in school and 44.4% claimed to have mathematics grades higher than most of their peers. Nearly all of Jillian’s students (94.4%)

considered themselves strong readers most of the time, 83.3% liked math most of the time, and 61.1% liked school most of the time.

Jillian felt that her teaching effectiveness was limited “a lot” by differing student abilities and disruptive students and “somewhat” by uninterested students and shortages in teacher and student materials. Considering her observed class, Jillian explained the range of experiences and ability levels of the students:

The 7th grade has a low maturity level; however they have been focused lately on the math. It does not take much for them to get off task. I must work at keeping other distractions to a minimum. I have a wide variety of learners. We have a transit population at my school, given school of choice, and unstable home lives. My students range from an ability of 2nd to 8th grade, with the average being a high 3rd grader. (Jillian, November 2014)

Like many novice teachers (Johnson, 2004), and indeed the other three teachers, Jillian reported challenges related to engaging and effectively teaching students with different abilities and managing her classroom. At the same time, like Steve, she referred to the policy context of school choice as directly influencing the makeup of her class of students. Specifically, she referred to a “transit population” in her school given that students either leave to attend another school or are enrolled after attending another school. The frequency of such transitions can add another layer of challenge to the work of novice teachers by putting the student population in flux. In fact, research indicates that student mobility can lead to several negative consequences for students and teachers. For example, mobile students tend to lack the relationships necessary to build social capital and “connectedness” within their new schools, are not often “counted” in terms of accountability data and teacher attention, and tend to disrupt teachers’ efforts to deliver

lessons and establish stable classroom culture (Scherrer, 2013). As accountability policies strengthen schools and teachers' responsibilities to effectively teach all students, the fact that students often come and go can make these efforts increasingly difficult.

Professional Context

In terms of the *professional* context, Braun et al. (2011) were interested in analyzing in part teachers' "experiences and policy management within schools" while "emphasizing broad professional contexts" as opposed to focus on school leaders or policy entrepreneurs (p. 591). The authors further noted that the professional contexts are not necessarily "coherent" and "uncontested," especially in the ways that individual departments operate as "fairly autonomous units" (p. 592). Additionally, Achinstein et al. (2004) asserted that the professional communities into which novice teachers are socialized are related to the kinds of professional development opportunities available to them. As noted earlier, research on professional learning communities (PLCs) indicates that they can influence teachers' opportunities to learn, interpretation of education reforms, establish trust among teachers and administrators, and expose teachers to social networks that might facilitate their development and retention. Table 11 presents the professional contexts of the focus teachers and in the following sections, I present the findings of analysis of the professional contexts.

Table 11
Teachers' Reports of Professional Contexts within their Schools as Reported on the FIRSTMATH NTQ

	Stacey	Joan	Steve	Jillian
Teachers' job satisfaction	Moderate	High	Moderate	Low
Frequency of engaging with other teachers about math	Low	Moderate	High	Low
Frequency of interactions with mentor	Moderate	Low	High	Low

Table 11 (cont'd)

Key limitations to teaching	Student abilities Teacher equipment	Student abilities Computer resources Teacher equipment Large class sizes	Student abilities Student backgrounds Uninterested students Shortage of textbooks Shortages of student equipment	Student abilities Disruptive students
Focus of professional development activities	math pedagogy curriculum critical thinking	Math curriculum Integrating technology Teaching gifted students	Math content, pedagogy, and curriculum Assessments Standards and testing Classroom management Communicating with parents	Classroom management

Stacey. When asked on the NTQ to characterize the job satisfaction of teachers at her school using a five-point Likert scale (very high, high, moderate, low, very low), Stacey's personal feeling was that job satisfaction among teachers at her school was moderate. On the same five-point scale, she felt that teachers at her school held high expectations for students, but that their degree of success in implementing the curriculum, parental support for students, and parental involvement were low.

These characteristics, perhaps not surprising given the economic disadvantages faced by the families of students at her school, seem to be related to teachers' lack of opportunities to engage in activities that support them in their challenges to meet the needs of their students. For example, Stacey's school was notable for very limited interactions among teachers. In fact, Stacey reported never or almost never engaging in discussions with other teachers about particular mathematics concepts, collaborating on preparing lesson materials, observing another teacher teaching, participating in formal meetings with other mathematics teachers to discuss

math teaching and learning, or participating in formal or informal meetings with a mentor to discuss mathematics teaching and learning.

Stacey's experiences correspond to findings of Chubbuck et al. (2001), who argued that novice teachers often express a lack of information about school operations and opportunities to meet formally with colleagues. Given Stacey's report that she had few opportunities to engage with her colleagues, readers may question the validity of her reports regarding her school's conditions. However, it should be noted that teachers often have informal opportunities to engage with colleagues (e.g., after-school events) through which they may be able to gauge their colleagues' job satisfaction and other school conditions. Indeed, in one interview Stacey did mention opportunities to meet with her colleagues as a member of the *school* team (i.e., a group of teachers and administrators that attends to school-wide issues like attendance), "...not necessarily about math, but about students in general and what we can do because they miss so much school."

Given her status as a novice teacher in her first year teaching at this particular school, Stacey's lack of opportunities to engage with colleagues are somewhat concerning. Without these kinds of collaborative conversations, she appeared to be "on her own" in terms of deciding how best to interpret reforms like the CCSS and meet the needs of her ELL students. Opportunities to engage with other teachers, especially those in her content area, might have given her access to a network with knowledge about how best to tackle such challenges.

In addition, Stacey had few opportunities to engage in professional development over the course of the study year. Responding to a question on the NTQ in which she reported the emphasis (on a four-point Likert scale of none, slight, moderate, or great) of professional development activities on a range of topics, Stacey noted that her opportunities placed great

emphasis on mathematics pedagogy, curriculum, and improving students' critical thinking. She reported that these activities placed moderate influence on math content, technology, formative and summative assessment, and standards and testing. However, little to no emphasis was placed on communicating with parents, classroom management, or teaching disadvantaged and gifted students.

Given the challenges that she expressed, these latter experiences were the kinds of activities that Stacey likely needed most. In fact, Stanulis et al. (2007) noted that mentors and administrators often fail to recognize that novice teachers yearn for extensive conversations and training about practices that might directly influence their needs in the classroom. In addition, Stacey's experience illustrates a general disparity between the policy demands placed on novice mathematics teachers and the support that is available for them to meet these demands. As the population of students in many schools across the U.S. grows more diverse, this lack of opportunities for novice teachers to learn how to adequately meet the needs of ELL students and children with other unique learning challenges may further disadvantage marginalized populations across the country.

Joan. In contrast to Stacey, Joan reported on the NTQ that job satisfaction among teachers at her school was high. She also claimed that teachers experienced a high degree of success implementing the curriculum and held high expectations for their students. However, parent support for students, parental involvement, and student desire to achieve were reported as moderate.

These results point to a sharp contrast between Joan's experience and what she perceived to be the experiences of other teachers at her school. While she saw other teachers as having high job satisfaction, success implementing the curriculum, and high expectations for their students,

the analysis of Joan's *situated* context revealed relatively low expectations for her students and serious struggles on her part to effectively teach them. This contrast may be linked to Joan's placement in a challenging classroom environment in her very first year of teaching, a common experience, research indicates, of many novice teachers (Johnson, 2004; Stanulis et al., 2007).

Joan additionally reported that she engaged in discussions with other teachers about particular mathematics concepts and collaborated on preparing lesson materials 1-3 times per week; however, she never or almost never observed another teacher teaching, engaged in formal meetings with other mathematics teachers to discuss math teaching and learning, or engaged in formal or informal meetings with a mentor to discuss mathematics teaching and learning.

Although at least some discussions with colleagues about math concepts and lesson plans was a positive opportunity for Joan, her follow-up interview comments revealed that many of these interactions took place with just one individual – her co-teacher. In other words, she did not express opportunities for engagement with a social network of teachers that might have provided her additional support. Furthermore, as a first-year teacher, Joan rarely engaged in meetings, either formal or informal, with a mentor. In this regard, her experience was similar to Stacey's and surprising given the fact that Section 1526 of the Michigan School Code (Michigan Department of Education, 2016c) requires that during a teacher's first three years of teaching, the school must appoint "one or more master teachers, or college professors, or retired master teachers who shall act as a mentor or mentors to the teacher." The fact that these novice teachers did not appear to receive the mentoring support promised to all beginning teachers speaks to the aforementioned disparity between the demands of policy on schools and teachers and the actual support that teachers receive to meet such demands.

While Joan reported weekly engagement in discussions and planning, she expressed in her post-observation interview that her co-teacher was not a “true co-teacher” and indicated that their conversations were often short. She also illustrated some organizational arrangements that may have made learning an extra challenge for her observed class of students:

We recently moved kids around, taking out advanced math students and replacing them with lower and generally better behaved students, because this class has "more special ed support." However, my co-teacher does not share planning with me and is only in my room for a short time, about when we are finishing journals. I sometimes have an aide for about five minutes at the end of class. Another special ed teacher comes in toward the end of class. She is supposed to take kids out, but she often stays to help out. If I had a true co-teacher, I would like to have math centers where we can work with smaller groups and have some extension activities too. I have talked to different teachers and asked them how can I reach these children. The overwhelming answer I get is that they don't know and to focus on the ones who actually care about learning. :((Joan, November 2014)

These comments highlight a substantial amount of juggling as Joan worked with other teachers to plan lessons and organize students, which may be linked to the frequent classroom disruptions observed in her class. They further illustrate a professional culture in which teachers focused their attention on teaching students “who actually care about learning.” Indeed, research indicates that the professional learning communities that teachers are a part of can influence the ways in which they interpret and respond to reforms in ways that further disadvantage marginalized students. Here, in the context of accountability demands, teachers in Joan’s school

encouraged her to turn her attention away from the most disadvantaged students to concentrate on “bubble” students, or those most likely to increase their scores on assessments.

In spite of her challenges in the classroom, Joan’s professional development opportunities over the past year focused on mathematics curriculum, integrating technology, and teaching gifted students. These activities gave moderate emphasis to classroom management, teaching disadvantaged students, summative assessments, mathematics content, and math pedagogy. Slight emphasis was placed on communicating with parents and formative assessments, and improving critical thinking.

Again, Joan’s professional development opportunities underscore the disparity between the demands that novice teachers face in their schools and the support that they actually receive. That is, while she struggled to juggle competing demands of students with unique educational challenges and a need to increase the proficiency of all students, her professional development opportunities mostly emphasized curriculum, technology, and gifted students.

Steve. Steve reported that at his school, job satisfaction among his teaching peers was moderate. He also reported that parental support for student success was high, but parental involvement, teachers’ expectations for students, and teachers’ success at implementing the curriculum were moderate. Student desire for achievement, according to Steve, was low.

These survey results suggest that Steve’s perception of students as having limited respect for adults is aligned with his view of students’ low desire for achievement. His perceptions also appear related to his reports of moderate job satisfaction and success at implementing the curriculum among his peers.

Steve’s perceptions were likely influenced by unusually frequent interactions with his colleagues, as compared to the other focus teachers. For example, he reported daily or almost

daily interactions with his peer teachers to discuss particular math concepts, collaborate on preparing lesson materials, participating in formal meetings with other mathematics teachers to discuss math teaching and learning, and participating in formal or informal meetings with a mentor to discuss mathematics teaching and learning. He even reported observing other teachers teach 2-3 times per month.

Yet, while frequent, these interactions may reinforce Steve's negative view of student effort and respect for adults. For example, in one interview Steve expressed that at times conversations with his colleagues

are more about letting it go instead of holding it all in because you don't want to be aggressive towards students. So time to just vent and say this student was stressing me out today. Most of the time it is about troubled students or those students causing trouble. It's the good kids who had those bad days. Then it is how they deal with a student compared to in my classroom. For example, there is one student in my classroom who is always out of his seat, walking around and then the social studies teacher has him and he sits in his seat and does his work and doesn't talk. So, what's the difference? (Steve, April 2015)

While this type of conversation may be typical among all teachers and does not represent all interactions that Steve had with his colleagues, it is telling in that it is the only conversation that he referred to and is aligned with his expressed frustrations trying to engage and manage his students in a context in which his school must worry about its "numbers" in terms of student enrollment. To the extent that teacher engagement in professional learning communities can enculturate novice teachers, Steve's interactions with his colleagues appeared to reinforce his negative perceptions of students.

Compared to the other focus teachers, Steve also had far more professional development opportunities. According to Steve, these opportunities had a broad range of foci and were largely aligned with his teaching challenges. The professional development activities that Steve has had opportunities to attend over the past year placed great emphasis on nearly all of the topics presented, including mathematics content, pedagogy, and curriculum; formative and summative assessments; standards and testing; classroom management; and communicating with parents. Moderate emphasis was placed on improving critical thinking and teaching gifted students. Only slight emphasis was placed on teaching disadvantaged students and integrating technology.

Jillian. Compared to the other focus teachers, the professional context of Jillian's school was exceptionally challenging. For example, she reported that overall teacher job satisfaction at her school was very low. Additionally, she reported that teachers' success implementing the curriculum, parental support for student success, and parental involvement were also very low. She did, however, report that student desire for achievement was moderate. These findings alone suggest that Jillian was learning to teach in an environment lacking sufficient levels of support.

However, she also reported few opportunities to interact with her peer teachers. For example, Jillian claimed that she never or almost never discussed particular concepts, collaborated on preparing lesson materials, or observed other teachers teaching. The only opportunities for engagement with colleagues that she reported were formal meetings with other mathematics teachers to discuss math teaching and learning and formal or informal meetings with a mentor to discuss mathematics teaching and learning 2-3 times per month.

Jillian's frustration with the lack of support that she experienced at her school was palpable in her observation interviews:

"Who reviews your lesson plans?" "Who can you collaborate with?" my answer to both those questions is no one. I am an island at my school, and half the time I'm questioning myself. I think I am teaching what needs to be taught, but I get no in-school observations or support, so I can be doing it all wrong and no one would know. (Jillian, November 2014)

Perhaps the most disheartening piece of these comments in terms of policy demands on teachers is the fact that Jillian did not know whether or not what she was teaching was even aligned with any standards. Her lack of support in determining what those standards were and lack of opportunities for collaboration only exacerbated her inability to meet policy demands. In fact, Jillian's experience was so challenging that in the middle of the study year, she resigned her teaching position and informed me that she could no longer participate in this study. Yet, her principal successfully convinced her to finish the academic year.

The opportunities that Jillian did have to engage in professional development activities over the study year placed great emphasis on classroom management and slight influence on improving critical thinking. According to Jillian, professional development activities at her school placed no emphasis on any other topics. These sparse professional development opportunities underscore Jillian's comment that she was "an island" at her school. Indeed, according to Jillian's comments, her school appeared to lack any community at all, let alone a professional development community.

Material Context

Braun et al. (2011) stated that the *material* context referred to the physical characteristics of schools, including buildings, budgets, staffing, technology, and infrastructure. They argued that these factors could influence ways in which policies were enacted in schools in multiple

ways. For example, the layout of a school building may limit the ease with which teachers can interact and collaborate. Budgets and staff can, of course, limit the delivery of professional development opportunities that help teachers understand and implement policies. Finally, technology and infrastructure can also mediate the ways in which certain strategies are utilized in classrooms. Similarly, Achinstein et al. (2004) referred to the level of physical capital that schools had to implement policy. Yet, the education policy demands remain the same for all schools – educate to new standards, ensure student proficiency, and hold teachers accountable.

In the following sections I briefly describe the material contexts in which the focus teachers worked and the ways in which policy demands may be reflected in their schools.

Stacey. Stacey's school was located just outside of downtown Detroit in a large brick two-story building built in the early 1900s. Opening the windowless steel doors revealed a somewhat dark hallway and a police officer manning a reception desk. Around the corner, the administrative office was well lit and spacious and the hallways were wide and rowed with lockers. Stacey's classroom was located on the second floor, a short walk up the stairs and around a corner from the administration office. Her room was large, with plenty of space left over for a row of desks lining the back of the room. The exterior wall had large windows that helped keep the room well-lit. Beneath these windows were a series of radiators for heat. In her lesson Stacey used a whiteboard, projector, and distributed calculators for the children.

Observations of the physical state of Stacey's school did not suggest any major barriers that would have severely limited her ability to meet the demands of policies. For example, the school structure did not appear to prevent teacher interactions and classrooms were conducive to student learning. Yet despite what appeared to be a typical physical school environment, on a NTQ question which asked the extent to which a series of conditions limited her teaching (on a

four-point Likert scale of a lot, somewhat, a little, or not at all), Stacey reported that her teaching effectiveness was limited by a shortage of teacher equipment. Furthermore, as noted above, Stacey had limited opportunities to engage in professional development or access resources to help her effectively meet the needs of her ELL students.

Interestingly, Stacey reported these limited opportunities even though her school had an instructional budget that, according to the Michigan Department of Education, was a relatively high compared to the schools of the other focus teachers at \$1.8 million in the 2014-2015 for a school serving 414 students (roughly \$4,300 per student). Further research would need to be conducted to determine the choices administrators at Stacey's school made in terms of allocating these funds, but at a minimum, money did not appear to be used to provide needed support for novice mathematics teachers struggling to meet the demands of policy.

Joan. Joan taught in a community located north of the capital city in a rural, one-story pale-brick building built in the mid-1900s. The school had a few windows punctuating the brick exterior and dark steel doors marking the entrance. The interior was well lit and Joan's classroom was a short walk down the hall from the administrative office. Like Stacey's school, this building had plenty of room for students to navigate the halls as they moved between classes and used their lockers. Joan's classroom, however, felt somewhat crowded. Her desk was situated in the back corner with student desks nearby. The front of the room had room for the teacher to move, but not much more than that. Otherwise, the room was comfortable and well-lit.

During Joan's observation, I witnessed some of the organizational juggling evident in her earlier comments. As students and teachers entered and exited the room, the lack of space seemed to compound what might have been minimal disruptions as other students had to adjust their chairs and desks to accommodate those coming in or going out. In this way, the physical

structure of the school may have contributed to Joan's challenge in teaching a population of students she characterized as disengaged or having emotional impairments.

The instructional budget for her school, according to the Michigan Department of Education, was \$1.5 million for a population of 386 students in 2014-2015 (roughly \$3,900 per student). Similar to Stacey's school, administrators at Joan's school did not choose to spend their funds in support of Joan's efforts to meet policy demands in her classroom. Further research is needed to determine how these funds were allocated.

Steve. In terms of physical context, Steve taught in the most affluent school of the focus teachers. His building, located near Lake Huron on the east coast of Michigan, was a newly built two-story structure with manicured lawns and a large pond in front of the school. Entering through the front doors, visitors were greeted by a receptionist behind a small desk in a large open foyer with vaulted ceilings and flooded with light from floor-to-ceiling windows. Lounge chairs were located in strategic locations around the room. Due to the size of the school, Steve's classroom was a couple of minutes away from the entrance. It was spacious and included the latest technology. His class size was small, so there were no problems in terms of crowding. Since Steve referred to frequent interactions with his colleagues and numerous opportunities to engage in professional development, the structure of the school appeared to provide no barriers to his efforts to meet policy demands.

In addition, administrators at Steve's school had access to a budget of \$2.5 million for a population of 717 students in 2014-2015 (roughly \$3,500 per student). While less than the budgets of the other two teachers, the fact that the structure was relatively new may have released maintenance funds to provide development opportunities for teachers. Again, further research is needed to make such determinations.

Jillian. Finally, Jillian taught in a school similar to that of Stacey. Located near downtown Detroit, her building was also a two-story brick structure built in the early 1900s. The entrance was marked by large ornate wooden doors leading into a somewhat dark hallway and the nearby administrative office. Large windows allowed plenty of light to enter classrooms on the exterior, where Jillian’s classroom was located. Her room was large, giving her plenty of space to move about the room.

While Jillian had access to technology, her comments suggested that it was not always reliable. For example, she noted that “if the Wi-Fi is down, I’m ready to conduct a whole-class lesson instead of small groups” (Jillian, November 2014). Lack of certainty about the computer system can be linked to the fact that Jillian’s school had the smallest instructional budget of the four focus teachers at \$387,000 for a student population of 350 (roughly \$1,100 per student). This budget may also explain the nearly complete lack of opportunities for professional development expressed by Jillian. In Jillian’s case, the physical context of her school may have further challenged her efforts to meet the demands of policy.

The demands of education policies as reflected in the *situated*, *professional*, and *material* contexts described in the sections above have important implications for the recruitment and retention of novice teachers. For example, novice middle school mathematics teachers working in *situated* contexts characterized by linguistically diverse students ELLs face a challenging task in helping those students reach the same accountability standards as students who speak English as their first language. Since many schools that serve these students have limited *material* assets, they may have limited capacity to hire the most highly-qualified novice teachers and/or provide those teachers with *professional* opportunities to learn how to teach diverse students. Without

these opportunities, novice teachers may experience lower job satisfaction and weaker intentions to remain in the teaching profession.

In the section below I outline the ways in which education policy demands exhibit influence on teachers' practices within these contexts.

Policy Demands as Reflected in Practice

In addition to reflections in schools, the demands of accountability policies are evident in the practices of novice teachers. Indeed, teacher evaluations bring standards and accountability reforms together to directly impact the experiences of novice teachers. The impact of evaluation policy demands on teachers' practices is linked to *performativity* and the kinds of roles that policy actors adopt in schools (Ball, 2003; Ball et al., 2011). For instance, in the context of evaluation, teachers experience uncertainty and instability as they are “constantly judged in different ways, by different means, according to different criteria, through different agents and agencies” (Ball, 2003, p. 220). In addition, teachers, administrators, and other stakeholders can take on a range of different roles in response to policy demands, including *narrators*, *entrepreneurs*, *outsiders*, *transactors*, *enthusiasts*, *translators*, *critics*, and *receivers* (Ball et al., 2011). In fact, the authors claimed that novice teachers tend to exhibit the role of *receiver* in that they demonstrate “high levels of compliance most of the time” and focusing on managing their classes often emerges as their chief priority (p. 632).

In this section, I present data from the focus teachers' follow-up interviews which indicate that, in their experience, teacher evaluations narrowed the definition of teacher effectiveness, challenged their efforts to teach diverse students, and moved them to seek the shelter of administrators.

Narrowed Definition of Effectiveness

The Michigan Department of Education's policy for teacher evaluations has been in flux for several years. For example, the current iteration (Public Act 173) builds on Public Act 102 passed in 2011 and recommendations from the Michigan Council for Educator Effectiveness (MCEE). Furthermore, under the current law, the proportion of teacher evaluations that are attributed to student growth is shifting from 25% in 2015-2016 to 40% in 2018-2019 (Michigan Department of Education, 2015a). The current law also identifies a set of four different evaluation protocols that administrators can use to evaluate teachers, in addition to the option for districts to use their own evaluation tools so long as they meet state standards (Michigan Department of Education, 2015a). These factors represent Ball's (2003) concern that teachers are constantly evaluated by differing criteria and tools.

The criteria used by the state to define teacher effectiveness are not necessarily aligned with teachers' own definitions of effectiveness. In contrast to Michigan's state law, the focus teachers in this study highlighted the complexities involved in defining an effective teacher. For example, Stacey noted that "I feel like there are so many pieces that go into that, and I've seen lots of different effective teachers and they've all done it a little differently." Joan added that being an effective teacher "means different things for different kids in different classroom environments."

The focus teachers then offered their own definitions of effectiveness. For Stacey, an effective teacher was one who "can reach the most amount of students individually and can constantly assess where the class is at to know where to go." In this one statement, she underscored three characteristics of an effective teacher: the ability to reach or connect with

students, to accurately assess or determine the needs of students, and then to know how to lead students in a meaningful way.

While it is unclear exactly what Stacey meant by the word “reach,” (i.e., help more students become academically proficient or connect with them on a personal level), Steve described the concept of “reaching” students as engaging students and relating to them on a personal level:

As an effective teacher, you keep the kids engaged in what you are doing in the classroom and you relate to your students. So, it’s not just about the topic at hand or the content you are trying to teach but also being there for the students who need you outside of the classroom as well. Because then you can relate to the student and know the background of where they’re coming from. So, if they are having an off day you understand why they are having an off day. (Steve, April 2015)

In her discussion of an effective teacher, Joan also used the word “reaching,” but in connection to student achievement, saying “I think if you are reaching the kids and they are gaining at all.” Joan’s idea that an effective teacher would help students “gain” in terms of achievement was not the primary component of teacher effectiveness for the focus teachers, but others did mention its importance. For example, Steve added that an effective teacher must “[get] the content across. Making sure that they are learning it – even those students who don’t want to learn it. A great teacher will still find a way to help them to learn it.”

Finally, Joan posited that an effective teacher is also one who is “learning and growing along with the kids.” Combining these comments, the teachers in this study presented a description of effective teachers as those who have the capacity to connect with and understand students on a personal level, accurately assess their academic abilities, plan to adequately help

them advance their learning, and ensure that they do, in fact, increase their learning. The tools that administrators used to evaluate these teachers likely include some or all of these components; yet it is telling that these teachers perceived the current evaluation policy as having a narrow definition of what it means to be an effective teacher.

The definitions of what it means to be an effective teacher that the teachers in this study provided echo those offered by novice Michigan teachers in other studies. For example, Youngs, Kim, and Pippin (2015) found that novice teachers expressed a definition of effectiveness as including student engagement, extensive planning, differentiated instruction, student achievement, and data-driven decision-making. In addition, although Ball et al. (2011) argued that novice teachers tend to take on the role of *receiver* of policy demands (as did Berliner, 2001), the comments presented above suggest that these teachers also adopted the role of *critic* at times. Ball et al. (2011) noted that teachers who adopted the role of *critic*, while often “marginal and muted,” tended to be primarily concerned with how policies are associated with working conditions and teachers’ well-being. A narrowed definition of effectiveness could, in fact, be perceived as a threat to teachers’ well-being. Brown (2015), for instance, found that novice teachers working in contexts in which “effectiveness” was increasingly measured by test scores made the work of novice teachers “insufferable” and contributed to turnover.

Their criticisms of the state’s evaluation policy were extended in their comments responding to the challenges they faced teaching a diverse population of students.

Challenges of Teaching Diverse Students

In general, teachers expressed that the state “can’t see” the challenges that they faced in the classroom on a daily basis. For example, Stacey argued that teachers – not policymakers – have a better understanding of what effective teaching entails in the classroom:

I think there are more pieces than what the state looks at – like test scores. We, as teachers, know that doesn't tell the whole story. You don't know how the child is feeling on that day or how far below grade level that student was. They may have improved two grade levels, but are still below grade level and the state sees that as they are not meeting the standard. So, I feel like there are other pieces that determine whether or not a teacher is determined to be effective. (Stacey, April 2015)

In another comment, Stacey further described the conditions that the “state can't see” when asked if her school's evaluation system accurately measured her effectiveness.

I don't think that it does because we know what we are stepping into – we know what the students are like – and the impact that we are having might not be that from fall to winter they have made a whole year's growth. That is what we want to see because they are already three grade levels below. State can't see that. State can't see what is going on everyday to get them there. So, I don't think it is an accurate picture of what is going on in all of the classrooms. (Stacey, April 2015)

Stacey's comments revealed a concern that the evaluation system ignores the challenges that she and other teachers face as they work to address the learning needs of diverse students. As a reminder, her classes included students from multiple language and cultural groups, many of whom were economically disadvantaged and lacked proficiency in mathematics. In Stacey's view, while her students may not all reach proficiency, they might demonstrate some growth that may not be captured in evaluations of her effectiveness.

Other teachers expressed frustration that evaluations do not capture their efforts to teach students that are simply disengaged and have no stake in performing well on the assessments used in evaluating teachers. For example, Steve noted the following:

We do performance testing here and from fall to winter my math scores dropped. I did so many different things to try to get these kids engaged, but you walk down to where they are testing and look and the kids are done in ten minutes. There is the challenge right there. How do I get my kids to take the time on the test and want to do good on it. If I could find that motivation, to make them want to do good on the test, then you would probably see an increase in my scores. But when they go in saying, ‘Oh this test doesn’t really affect me.’ You can preach to them and say, ‘This effects how I look as a teacher, so please do your best.’ But that’s about all I can do. (Steve, April 2015)

Again, the sentiments expressed by the novice teachers in this study correspond to recent research investigating teachers’ perceptions and responses to teacher evaluation policies in Michigan (i.e., Youngs, Kim & Pippin, 2015) which found that teachers tend to highlight the fact that “people who are in [teaching] realize how layered (teaching is)” as opposed to policymakers who “can’t see” the depth of these layers (p. 435). Teachers’ perceptions that the evaluation system does not accurately account for their efforts to teach a population of students with different cultural and economic backgrounds, abilities, and commitments to achievement has important implications for equity and retention. Even the best novice teachers who may feel powerless to improve their performance on evaluations, despite the fact that they are doing “all they can do” in the classroom, may be inclined to focus their attention on the students most likely to improve, seek positions teaching different students, whether at the same school or a different one, or leave the profession altogether. In fact, research indicates that teachers in low-performing schools tend to leave teaching at higher rates after the implementation of accountability programs (Clotfelter, Ladd, Vigdor & Diaz, 2004).

Shelter of Administrators

The teachers in this study revealed their appreciation for the role of administrators in sheltering them from policy demands. According to Ball et al. (2011), school administrators traditionally adopt the roles of *narrator* and *translator*. That is, they interpret policies and seek to communicate those policies to teachers and community members. In fact, schools with administrators who are effective in these roles and are able to maintain strong positive relationships with teachers tend to experience lower rates of novice teacher attrition (Pogodzinski, Youngs, Frank & Belman, 2012). However, just as Ball et al. (2011) found, the teachers in this study seemed to be “shielded from policy by more senior colleagues” who, in this case, were their administrators (p. 632). Joan, for example, expressed that “I think for me [the evaluation system] is working pretty well. This principal just hired me and she likes me and wants to see me do well.” She also stated that “I don’t know that the current system is terrible. Teachers have always been evaluated.” In part, her perception of the evaluation system appears tied to her relationship with her principal and the feedback that she received through the evaluation process.

I feel that that part of it has been really helpful to me. She notices – you are having class discussion here and that is a good thing. How can we make this happen in other groups?

So, I feel like she has given me good feedback. (Joan, April 2015)

Similarly, despite his expression that his evaluation was challenged by his students’ lack of motivation to perform well on the exam, Steve explained that at his school, “when the administrators come around, I think they notice all of the things you try to do in your classroom [and] I don’t think it goes unnoticed.”

By providing meaningful feedback and “noticing” the efforts of teachers in the classroom, administrators seemed to make teachers feel that, in terms of their evaluations, their classroom practices would shield them from the difficulties they faced demonstrating improved achievement with a diverse student population. In turn, these teachers expressed minimal resistance to evaluation reforms. Therefore, administrators could be seen as both implementing the policy and minimizing potentially overt criticism or resistance from novice teachers for whom evaluations may have higher stakes than for more experienced teachers.

Whether or not novice teachers felt sheltered by their administrators, the demands of the evaluation system and process added strain to their work. Joan, for instance, stated that “we are all stressed out – what was our evaluation, what was your evaluation? Where do we fall in place because the one who got the lowest is the one that goes. That causes a lot of stress.”

Conclusion

The novice teachers introduced here work in schools that generally serve student populations that are characterized as economically disadvantaged, low-achieving, and/or diverse in terms of cultural background and emotional or behavior challenges. Additionally, they often lack access to professional development opportunities to support them in their efforts to meet the needs of these students. Access is limited in part by variation in the status of their schools’ finances and facilities.

Within these contexts, the novice teachers faced considerable demands from policies that held them and their schools accountable for students reaching proficiency on state assessments. According to the teachers, these demands did not fit their own definitions of effective teaching or attend to the challenges that they faced teaching diverse students. Furthermore, they pointed to

the ways in which school administrators adopted roles at times that sheltered them from policy demands.

The demands of education policies, the school contexts in which they function, and teachers' perceptions of these policies, interact in ways that impact novice teacher recruitment and retention. For example, lower-resourced schools (e.g., *material* context) may have limited capacity to recruit the most highly qualified novice teachers to serve the typically lower-achieving, diverse population of students (e.g., *situated* context). Furthermore, limited financial resources make it difficult for them to adequately support novice teachers with professional development activities (e.g., *professional* context) that could help them in their efforts to meet accountability policy demands. Novice teachers in these schools may be more inclined to seek employment at better-resourced, higher-achieving schools with less accountability pressure or leave the profession.

In the next chapter, I present analysis of the ways in which the novice teachers' backgrounds and contexts described here mediate their teaching practices.

CHAPTER 6: TEACHERS' PRACTICES AS MEDIATED BY BACKGROUND AND CONTEXT

Ball et al. (2011) argued that for novice teachers, “managing in the classroom is the prime reality” and “short-term survival is their main concern (p. 632-633). Teachers’ backgrounds, including their demographic, educational, and professional characteristics, interact with their teaching contexts to influence how they “manage” and “survive” in the classroom. How successful novice teachers feel as they struggle to meet the challenges of their respective teaching contexts, while attending to the demands of shifting accountability policies, may influence their job satisfaction and, ultimately, their intention to remain in the teaching profession.

Utilizing Michigan State University’s ASSIST program (Michigan State University, 2016), I analyzed the ways in which the focus teachers managed their classes, planned instruction, taught content, and responded to their students. I describe the results of this analysis in the following sections.

Managing Classes

Not surprisingly, many novice teachers struggle to manage their classrooms in ways that facilitate student learning and often lament what they see as inadequate preparation in classroom management (Johnson, 2004). This is not a new phenomenon. For example, Emmer and Stough (2001) cite U.S. literature from the 1970s indicating that compared to experienced teachers, novices “appear to be less assured in the specificity and depth of their knowledge about classroom management” (p. 106). In the context of increasing accountability, how teachers manage their classes may be especially important. That is, students are unlikely to learn mathematics content and perform well on assessments if their classroom contexts are chaotic.

Yet classroom environments are often interrupted by students and other teachers entering and exiting the room, problems regarding the implementation of the lesson, and student behavior (Kennedy, 2005).

ASSIST proposes a set of tools for novice teachers to help address these “threats to tranquility” (Kennedy, 2005), including suggestions for establishing rules and routines, forming and building relationships with and among students, motivating learning, and dealing with misbehavior. For example, common routines for classes as a whole, individual lessons, and interactions with students can be effective in helping to reduce time-wasting disruptions and maintain student engagement in learning the content being conveyed. Indeed, as policymakers strengthen accountability policies demanding that teachers demonstrate student achievement growth, novice teachers must quickly learn how to best manage their classrooms. Overseeing the behavior and learning of students from a range of backgrounds may warrant helping novice teachers to develop such skills; however, the experiences of the teachers in this study suggest that background and context, not preparation in classroom management, are linked to success in this category.

Stacey, for instance, reported feeling only slightly prepared to manage her classes. Specifically, as presented in Table 8 above, she felt “not at all” prepared to set up activities and have a positive influence on difficult or unmotivated students and only slightly prepared in terms of effective classroom management. Yet her observed lesson was notably organized compared to the other three teachers. One might assume that her particular teaching context – characterized by multi-cultural, economically disadvantaged English language learners and limited opportunities for collaboration and development – could result in classroom chaos. However, Stacey exhibited calm and structured behavior and managed a clearly organized lesson. She

noted that, “today was typical modeling and independent practice” and that “it varies between the days of the week whether they work with partners/groups and I try to spend one day on center activities so they are moving around the room while practicing.” While her responses on the NTQ revealed that she did not feel adequately prepared to manage her class, and perhaps had few opportunities to collaborate with others regarding this challenge, in her three years of teaching in challenging contexts Stacey clearly developed a set of rules and routines that enabled her to successfully manage what most would consider a difficult classroom.

Kennedy (2005) argued that “routines are the most enduring practices that teachers devise” and include systems for processes like how teachers call on students, how they will distribute classroom materials, and how they will collect and return assignments (p. 83). In Stacey’s observed class, it was clear that she had established routines for these tasks. For example, at the end of the class students had to submit an “exit card” with their response to a question prior to exiting the room. Students quietly completed the card and as they individually completed the task, placed their calculators in a bin designated for their class, gathered their belongings, presented the card to Stacey, and exited the room. There were no disruptions throughout this process.

In spite of Stacey’s report that she had limited preparation in classroom management, her success in the classroom may be linked to her preparation program. For example, the program she completed is widely considered a rigorous one and included a full year of student teaching. Therefore, although she was in her third year of teaching, Stacey technically had nearly four years of teaching experience to draw upon in managing her class. In addition, her preparation program encourages students to engage in deep reflection about their teaching practices throughout the internship year and beyond. Critical reflection of her own preparation,

experiences, and skills may have contributed to both Stacey's perceived lack of preparation and her ability to effectively manage her class. Indeed, as a likely result of her organization, the observed lesson had minimal disruptions and Stacey was able to address them without derailing the overall flow of progress.

Stacey's success in managing her classroom begs the question of where she looked for resources to supplement her reported lack of preparation in this category. Table 12 presents the four teachers' responses to a question on the NTQ which asked them to characterize the importance of each resource in their learning to teach mathematics. According to these results, Stacey saw the teachers at her school, the school principal, and the curriculum or standards as the most important resources to her practice. Given her reported lack of opportunities to engage with colleagues, it is somewhat surprising that Stacey identified them as the most important resources for her practice. This finding suggests that perhaps Stacey engaged in more informal conversations with her colleagues than were captured in her questionnaire responses. Notably, the least important resources for Stacey were those from her teacher preparation program.

Table 12
Importance of Resources for Learning to Teach Mathematics as Reported by Teachers on the FIRSTMATH NTQ

	Stacey	Joan	Steve	Jillian
Resources from teacher prep program	Slightly	Somewhat	Very	Slightly
Professor(s) in teacher prep program	Not at all	Slightly	Very	Not at all
My own resources	Somewhat	Somewhat	Very	Somewhat
The teachers in my school	Very	Very	Very	Not at all
The school principal	Very	Somewhat	Very	Not at all
My mentor teacher in current school	Somewhat	Somewhat	Very	Not at all
In-service programs	Somewhat	Very	Very	Not at all
School curriculum or standards	Very	Very	Very	Not at all

Note. Possible responses included not at all important, slightly important, somewhat important, or very important.

In contrast to Stacey, Joan reported being very prepared in terms of classroom management, but her observed lesson lacked organization and was fraught with the kinds of disruptions and interruptions Kennedy (2005) described. For example, on multiple occasions

during the observed lesson, Joan interrupted her instructions to the class to attend to the disruptive behaviors of a few students. Additionally, in her interviews Joan commented that her co-teacher often entered the classroom near the end of the lesson or at times when Joan and the students were engaged in an activity. Also, in her post-observation interview she referred to a recent failed attempt to structure her class in which she “broke the kids into groups and had them complete questions together.” Her plan “worked well for the higher kids, whom I still had at the time. Unfortunately, for many of the kids it was an opportunity to mess around.”

Joan did not necessarily lack established routines in her classroom; for example she noted that “we start each class with warm-up problems.” But overall, the observation of her lesson seemed to reveal fewer procedural routines that might have helped her to limit or address student and teacher disruptions. At the same time, these disruptions may have been instrumental in limiting Joan’s ability to establish norms and routines in the first place. As she noted in previous comments, part of her challenge was managing a class of students with widely different ability levels that included several pupils with emotional impairments, with minimal help from her co-teacher.

Interestingly, Joan and Stacey completed their teacher preparation programs at the same institution, although at different times. This fact seems to illustrate the enduring influence of teachers’ backgrounds on their practices in the classroom. It is notable, for instance, that Joan entered the teaching profession later in life; she was 43 years old at the time of this study and in her first year of teaching. It is quite likely that she and Stacey had very different schooling experiences prior to their entrance into teacher preparation programs. Lortie (1975), through the concept of the “apprenticeship of observation,” famously illustrated the ways in which a teacher’s schooling experiences can shape their understandings and perceptions about the ways

that teachers and students should behave and schools should operate. As a middle school student in the 1980s, Joan likely experienced a markedly different school and teaching environment than the other teachers in the study, who entered middle school in the early 2000s. For example, in a historical assessment of teachers' practices in the U.S. from 1980 to 1990, Cuban (1993) argued that "both national and local evidences suggest a strengthening of teacher-centered instruction in the 1980s" (p. 232). Therefore, Joan's understanding of how teachers teach was likely influenced through her observations of teacher-centered classrooms. This may provide some insight into the ways in which she structured her class around teacher-directed discussion, saw the disruptive behavior of students as "messaging around," and interrupted the lesson to address personally address each student disruption.

Like Stacey, Joan primarily looked to her colleagues and the school curriculum or standards for resources instead of her preparation program (see Table 12). In fact, as noted earlier, she reported having opportunities to meet with her colleagues a few times per week to plan and collaborate. In addition, she reported placing high importance on the resources she gained from professional development activities, even though these activities did not always align with her expressed limitations to her teaching (see Table 11). Overall, perhaps the lower "quality" of Joan's lesson, in comparison with Stacey's, may be attributed to the fact that the observation took place in her first year of teaching. If so, her experience highlights an enduring disconnect between some novice teachers' perceptions of their preparedness for teaching and the realities of their classroom practices (Johnson, 2004).

On the FIRSTMATH NTQ, Steve reported that he was not at all prepared to manage his classes. Yet compared to his counterparts, Steve had a relatively small class to manage. Therefore, not surprisingly, his observed lesson included minimal disruptions and went

according to his lesson plan. This is not to say that Steve lacked organization or established rules and routines. In fact, in his pre-observation interview he stated that “the class will consist of a warmup, followed by a review of the previous day’s material, and then new lecture notes and discussion.” Furthermore, he seemed to have strong rapport with his students and they were cooperative in response to his instructions. Yet, it is worth remembering that Steve enjoyed one of the most advantaged teaching contexts with his small class size, modernized facilities, and considerable professional development opportunities. Steve’s experience seems to highlight the ways in which advantaged schools with the capacity to support novice teachers by assigning them limited numbers of students and providing ample opportunities to collaborate and engage in professional development activities may be able to mitigate limitations in beginning teachers’ preparation to perform tasks like classroom management.

Jillian also reported feeling poorly prepared in terms of classroom management. Given the fact that her preparation program included just three months of full-time teaching experience, it is perhaps not surprising that Jillian held this perception. The results of her observation seemed to reinforce her feeling in that her lesson included a substantial number of disruptions and complications. She also faced the challenge of managing a class of students with widely varying ability levels. For example, she noted that “most of my middle school students are at a 3rd grade level, thus we will be developing basic skills as a scaffold to grade level.” Like Joan, she also struggled to work with two separate sets of students who were working in “rotating groups” in which “one will be computer-based the other with me addressing missing remedial skills.”

Consistent with her comment that she was an “island” in her school, Jillian reported placed no importance on any of the school-based resources listed in Table 12 (e.g., fellow teachers, mentor, principal, or professional development opportunities). In fact, the only

resources she reported as being at all important were those from her teacher preparation materials and her own resources, and, in her view, these were only slightly and somewhat important, respectively.

Planning Instruction

Of course, classroom management is linked to how and what teachers plan in terms of instruction. Furthermore, policy demands in Michigan require teachers to plan mathematics instruction according to the CCSS. In terms of daily planning, ASSIST offers tools for novice teachers to examine their lessons to clarify goals, materials, management, and support for all learners. Furthermore, the site includes a rubric for examining the “mental challenge” of teachers’ learning activities. For example, activities can require students to produce facts and procedures, require students to make decisions and provide explanations, or require students to explore underlying concepts.

Interestingly, Stacey was the only teacher in this study who explicitly mentioned referring to standards as part of her planning activities, a finding that serves as a reminder that novice teachers can respond to policy demands (or not) in ways contrary to the intentions of policymakers. Stacey stated that “first I determine objectives based on curriculum, standards, and the previous day's work.” She also claimed that she spent a substantial amount of time choosing appropriate examples and condensing information for students prior to class. She also prepared copies for class activities and student homework. Although she reported on the NTQ feeling underprepared to set up learning activities, these comments from her pre- and post-observation interviews indicate that Stacey thought carefully about her daily lesson plans and the materials she would need to accomplish her objectives. Stacey’s planning corresponds to research finding that teachers referred most to district or state education policies when asked to provide a reason

for their choice of instructional objectives (Kennedy, 2005). In a context of standards-based reform and working in a school under accountability pressure due to low student achievement scores, it is no wonder that Stacey consulted the CCSS in her planning.

Again serving as a stark contrast, Joan commented in her pre-observation interview that she “didn’t write a lesson plan per se....” However, she did report thinking “about different ways to explain how to think about problems” and looking “at the objectives we are trying to accomplish” when planning the observed lesson. To give her the benefit of the doubt, her efforts to look at the “objectives” may have included reference to the CCSS, but without creating a lesson plan it is difficult to see how she might have explicitly connected the standards and objectives in her lesson. It is also interesting to note that her school administrators did not require or seem to encourage her to complete and submit any lesson plans, even as a first-year teacher.

Steve did not explicitly refer to the CCSS or any formal objectives when planning his lesson. Instead, he “did extensive searching on the internet” because he likes to “take the ideas I have about a topic and build a lesson by looking at other teachers ideas.” While this may strategy may be helpful in formulating a lesson plan, Steve’s lack of reference to standards, objectives, or even any goals for his students’ learning is concerning. Yet, citing Porter (1989), Kennedy (2005) noted that teachers who did not experience “outside influences” on their teaching tended to rely on their own “values and convictions” when considering learning objectives for their students. Steve’s experience appears to align with teachers in this category. That is, since Steve seemed to hold confidence in the ability of his principal to shield teachers from the consequences of accountability and low-achieving students, perhaps he felt at liberty to follow his own intuition in planning his lessons.

Jillian referred exclusively to her students in her description of lesson planning, stating that she “created real world problems involving students’ interests.” Furthermore, she made a special effort to ensure that the problems were appropriate for the ability levels of her students. For example, she noted that she “made sure all numbers added and divided so that there were no reminders for my low group. The high group has numbers in which most divide out to the nearest hundredth.” Like Steve, then, Jillian made no reference to standards or formal objectives in planning her lessons. This seems consistent with her report in Table 12 that school curriculum and standards were not at all important resources in her teaching. Jillian’s experience points to the severe consequences for novice teachers who may share similar experiences and make efforts to leave the school or profession, but also for the students who may be left behind in the process.

Teaching Content

Perhaps the most important teaching practices involve the delivery of actual content, ideally linked to content standards. While proponents of stronger accountability policies tend to argue that such policies do not mandate how (or even what) teachers should teach, clearly novice teachers must develop strategies that facilitate student learning of standards-based content. For middle school mathematics, ASSIST provides tools for monitoring interactions, motivating students, and organizing classrooms. The tools for motivating students encompass the other two topics through six strategies: using math in meaningful and realistic contexts, relating math to student interests, questioning for discussion and discovery, utilizing tangible tools like manipulatives, engaging students through guest speakers or field trips, and facilitating multiple demonstrations of student knowledge.

In the observed lesson, Stacey taught her students about converting fractions to decimals. She planned to have students engage in whole-class, small-group, and independent work and

expected her students to “recognize when a decimal terminates and repeats.” Compared to the other three teachers, Stacey engaged in more complex questioning of her students, asking them repeatedly to explain themselves and how they knew and understood a concept. She also consistently had students engage with the projector and white board to demonstrate their solutions to problems. However, she did not connect the problems to realistic contexts or student interests. Given that she taught a class of students with cultures that were likely unfamiliar to her, it is not surprising that Stacey did not connect the content in this way. Overall, Stacey expressed a high level of comfort with the strategies she used to teach the lesson:

I felt comfortable teaching conversions between fractions and decimals because I have taught it multiple times before, although this was a new lesson to me. I would say I feel just as comfortable modeling and helping students individually as I do when I get to meet with groups as they rotate through centers. I enjoy working with the small groups more so you can see what everyone is doing without running around the room as students have questions. (Stacey, December 2014)

Stacey’s comfort with her pedagogical strategies was evident in the ease with which she transitioned between activities and worked with small groups of students. Also, as noted earlier, Stacey’s lesson progressed as she had planned.

Joan’s lesson, on the other hand, did not progress as she expected. In her class, she helped students prepare for a chapter test on how to “turn fractions to decimals and decimals to fractions” and “compare and order fractions and decimals.” However, she seemed to have no idea whether or not the students actually learned this material. For example, in her post-observation interview, she expressed that “hopefully, we covered some questions students still had.” In the lesson she did pose questions aimed at generating discussions about the topic and

attempted to elicit demonstrations of student understanding. Yet, as noted earlier, her attempts were often interrupted by student disruptions. Indeed, she pointed to student behavior as the main challenge to the lesson, stating that “my main frustration was the behavior of the kids. Some of my higher kids would rather be amused by the EI kid spouting nonsense than be leaders in their class.” Sadly, she described the lesson as “a pretty typical day in my room.”

Although Joan “felt comfortable with what [she] was teaching” and her “pedagogy was as comfortable as normal,” she experienced difficulty reaching her students or relating mathematics to their interests. Part of her frustration, she pointed out, was actually due to her belief that students should be given opportunities to explore and think, a strategy that was not supported by her colleagues.

I have tried different ways to get these kids engaged. What seems to work best for them in other rooms is to tell them specifically what to do without giving them time to think and explore, like what the math Essentials program would be like. I haven't given up yet on the importance of letting them explore, but they generally aren't willing to stretch their minds and think. Ugh! (Joan, December 2014)

Although the CCSS encourage teachers to facilitate discussion in which students have multiple opportunities to demonstrate their learning and “stretch their minds and think,” the context in which Joan taught discouraged this practice. That her students encountered prescriptive instruction in other classrooms likely minimized the likelihood that they would respond to alternative strategies in Joan’s class. While she claimed to be maintaining her support of student exploration of mathematics topics in her class, she also hinted that this support was tenuous, evidence of the powerful interactions of teacher backgrounds and contexts in mediating practices.

In his lesson, Steve focused on the rules of multiplying exponents. He planned to try a new technique for checking for student understanding that involved students using “colored cups to inform me if they need help, somewhat understand the material, or they know exactly what they are doing.” Despite his efforts to gauge student understanding, Steve did not consistently engage in questioning strategies that promoted discussion or facilitating student demonstrations of their learning. He did, however, express his desire to make his classes relevant to his students.

I believe that making everything relevant is really important. Somehow you have to help the students see how they will use it throughout their life. I explain to my students that we may not use everything we learn in math, but it helps us problem solve, and problem solving skills is something we need every day. (Steve, December 2014).

In light of his discussion of novel ways to check for student understanding of the content, it is interesting to note that student learning did not seem to factor into his estimation of the success of the lesson. Instead, Steve felt that the lesson was successful because “the students were engaged most of the hour and we accomplished everything I had planned for the hour.”

In her lesson, Jillian introduced and modeled how to find the average and students followed her with guided practice. The warm-up to the lesson included practice multiplication and division problems. In an effort to engage the students, Jillian framed her lesson with relevant real-world situations in which students encounter averages. For instance, she used example problems that required students to consider yards per game, texts per day, and their own grades. After the lesson, Jillian felt that it went well, but “wish[ed] that [she] had review[ed] more difficult division in the warm-up” because the students were not able to “divide more fluently.” She noted that it was a typical lesson for her and that she felt comfortable with the content since she “taught it many times before and [felt] it's easy to explain due to its real-world application.”

Her pedagogy was also familiar and comfortable and “the small group arrangement allows for more one on one time with needy students.” Finally, Jillian considered operational fluency to be the most pressing need of her students, but lamented that “reviewing these skills daily takes times away from lesson and depth of knowledge.”

Responding to Students

As novice teachers work with increasingly diverse populations of students, how they respond to those students has important implications for learning (Villegas & Lucas, 2002). ASSIST offers too many tools to describe here, but they include a range of strategies for developing classroom community, learning about student’s families, planning units and lessons that fit all students’ learning styles, responding to disruptions and behavior problems, managing discussions, and monitoring student progress. In their interviews, the teachers in this study identified multiple ways in which they seek to respond to and meet the learning needs of their students.

Stacey, for example, reflected on her own strengths and weaknesses by noting “I have to learn how to explain something in different ways – usually the way I feel most comfortable and at least one other way for the students who do not learn the same as myself.” In a class of students with cultural backgrounds quite different from hers, it is especially important that Stacey engaged in this type of reflection to better serve her students. Indeed, Stacey, like most of the teachers in this study, fits the description of the typical novice teacher in the U.S. in that she is a white, middle-class woman (Ingersoll et al., 2014). In this comment, she seems to allude to a kind of “sociocultural consciousness” (Villegas & Lucas, 2002) that her students’ ways of thinking and knowing are influenced by their race, ethnicity, and language, and that she recognized her need to attend to these differences in her instruction. Her efforts in this regard are

commendable considering that she reported few opportunities to learn strategies to teach pupils from different cultural backgrounds. Stacey also recognized and reflected upon her weaknesses in terms of mathematics content, acknowledging her need to ensure her own understanding before teaching her students. For instance, she stated that she spent “extra time on the geometry as that is not my strength, whereas the other lessons are easier for me to review and teach.”

In addition, she referred to her efforts to aid “students who have been absent frequently, or lack language component, or may have a slower process to mastery.” Part of her aid involved taking extra time to “meet with ELL students one-on-one more and placing them next to other students who can assist.” These efforts likely helped Stacey to develop a classroom community in which disadvantaged students recognized her dedication to their learning and more advantaged students were engaged in efforts to improve the success of their classmates. Similarly, in her pre-observation interview, Stacey mentioned that the “session may be difficult for two students in particular as they heavily rely on my note-taking but during the independent exercise I will be able to assist them more between posting expressions as other students will have partners to double-check their work.” Overall, Stacey’s efforts to respond to the needs of her students likely helped minimize disruptions and maximize learning in her class.

While Stacey pointed to specific efforts in which she attended to the needs of her students, Joan seemed to rely on the students to help themselves. For example, as noted above, she seemed unaware of whether or not her students understood the lesson, noting that “hopefully, we covered some questions students still had.” Furthermore, she stated that “my hope is that they start making better connections.” In these and other ways, Joan seemed to express a sense of powerlessness in terms of responding to her students in ways that might contribute to their engagement and achievement. For example, she argued that the success of her lesson would

“mostly depend on if the kids decide to be engaged in what we are doing or they decide they can't do this and check out” and “if my special ed support is able to come to my class as scheduled.” Joan’s comments correspond to other novice teachers in Johnson’s (2004) work who were surprised about “how little the students – even the good ones – seemed to care about class” (p. 75). Like Joan, these teachers, who were excited about the content of their subjects, continually struggled to get their students engaged in the experience of learning.

Joan’s sense of powerlessness speaks to the common expression among novice teachers that there is a gulf between their preparation and classroom realities (Johnson, 2004). Indeed, compared to the other teachers in this study, Joan expressed moderate to high preparedness to establish a supportive classroom environment, manage a class effectively, and positively influence difficult or unmotivated students. Her comments and teaching practices, however, suggested otherwise. As noted earlier, Joan’s frustrations may have been exacerbated by the different “apprenticeship of observation” she experienced compared to her students, and even the other teachers. That is, having attended school during an era of teacher-centered instruction, she may have expected her students to more readily follow her instructions and apply themselves to learning the content she delivered to them.

Like Stacey, Steve responded to the needs of his students by trying to differentiate his instruction for different types of learners. For example, he noted the following:

Most of my students in the class are visual learners. They learn by seeing the steps and can usually pick up the information from there. However, with the students who struggle to learn visually, I try to have an activity that gets them moving or thinking differently about the subject. (Steve, December 2014)

Yet in the observed lesson Steve made no effort to relate the mathematics content to student interests. In fact, in a comment that was either a reflective self-critique or a simple statement of fact, he noted that “in this particular lesson I did not do anything to make the material more relevant.” In one way, Steve’s admission is not surprising in that he reported being only slightly prepared to set up learning activities or establish a supportive classroom environment. At the same time, compared to the other teachers, Steve reported frequent opportunities to engage with other teachers and activities to develop such skills. He also reported that he considered every resource (e.g., colleagues, principal, professional development opportunities, etc.) to be very important to his teaching.

Jillian, compared to her counterparts, reported very limited preparation and opportunities to learn strategies that might have supported her efforts in the classroom. Yet she did structure her lesson in such a way to provide support for the students with the most need. Prior to the observation she stated, for instance, that the observer would “see some students working more independently, while I provide more support to those who need it.” Through the ways that she organized the class, Jillian seemed to also strive to enhance relationships between students by having “groups working together and checking each other’s work and their discussions.” She also sought to make the mathematics lesson relevant to her students by using “their interests (basketball, football, and grades) for subjects in the story problems.” Despite these efforts, as noted earlier, Jillian struggled to manage the class and numerous student disruptions during the observed lesson.

Conclusion

The four teachers in this study reported varied levels of success in their efforts to manage their classes, plan instruction, teach content, and respond to their students. These efforts were

mediated by the teachers' backgrounds and the contexts in which they taught. The interactions of background and context highlight the complexity of the decisions that novice teachers make in their efforts to learn to teach and meet policy demands while attending to the needs of an increasingly diverse population of students.

The accounts of these four teachers illustrate the enduring “sink or swim” experience common to many novice teachers in which they tend to have the most challenging teaching assignments, yet lack adequate mentoring and support to help them to be effective in those assignments (Stanulis et al., 2007). Scholars have called for “policies to ease this transition from teacher preparation programs to the real world of schools and classrooms,” yet the problem persists (Borman & Dowling, 2008, p. 399). Schools and administrators who are able to support novice teachers with induction and/or mentoring programs as they are learning to teach have a better chance of developing quality novice teachers who are effective in the classroom and intend to remain teaching (Guarino et al., 2006). However, again, novice teachers often work in schools with limited capacity for such programs.

In the next chapter, I summarize the findings relative to each teacher before discussing the implications for novice teacher recruitment and retention, as well as future research.

CHAPTER 7: DISCUSSION AND CONCLUSIONS

In this study, I used policy enactment (Ball, 1998), socialization (Achinstein et al., 2004), and teaching practice (Michigan State University, 2016) frameworks to analyze the experiences of four novice middle school mathematics teachers working in challenging schools and sought to describe the education policy contexts, the teachers' backgrounds, the school contexts in which they worked, and how their practices were mediated by these factors. I chose to concentrate on these teachers because (a) I wanted to analyze deep information from a small sample of individuals, (b) teachers in challenging schools are often seen as instrumental to successful education reforms, (c) these schools are typically under greater pressure than more advantaged schools to respond to accountability reforms, and (d) middle school mathematics is a crucial point in U.S. schooling that can impact students' future success and requires effective teachers to help students reach proficiency.

In the sections below I summarize the findings before discussing the implications of these findings for novice teacher recruitment and retention, the limitations of the study, and future research.

Summary of Findings

The novice middle school mathematics teachers in this study worked in an education policy context not unlike Ball's (1998) concept of the "market model." This model is can be characterized in part by the decentralization of education decision-making, strengthened linkages between schooling and employment, and the intensification of national and international comparisons of student assessments. Analyses of key documents at the state, national, and international levels revealed evidence aligned with the "market model" and indicated that

Michigan can be seen as a kind of case of national and international trends towards the adoption of this model of education.

First, the current standards reform policy in Michigan – the Common Core State Standards – are state-generated standards for K-12 education that the authors stressed are in no way a curriculum and that teachers maintain the power to teach the standards in any way that they and their school deem appropriate. Second, these standards are linked to increasing calls for content and teaching strategies that focus on the links between schooling and employment. For example, many state and national policies seek to ensure that students will be “college and career ready.” Finally, state and national education policymakers are responding to comparisons of student scores on international assessments with efforts to boost U.S. student scores under the assumption that these scores are linked to economic growth.

Other education reforms in Michigan speak to the influence of the “market model” as well. For example, school accountability measures give each school in the state a “scorecard” that can be used to rank school performance and facilitate parents’ right to exercise public choice through the state’s “schools of choice” option, which allows families to enroll their children in alternative schools in or outside of their district.

Finally, teacher evaluations bring standards and accountability into the classroom by holding all teachers responsible for the proficiency of an increasingly diverse student population. Novice teachers, who tend to work in under-resourced schools with limited capacity for support, lack the job security of their more experienced counterparts, and who are engaged in the struggle to navigate new schools, curricula, and students bear a considerable burden as they struggle to “manage” and “survive” in the classroom.

In fact, this study reveals that teachers' experiences in the classroom, perhaps more than other factors, may be related to their success with diverse students, job satisfaction, and intentions to remain in the teaching profession. In the following sections I summarize the experiences of the novice mathematics teachers in the study.

Stacey

Stacey completed a five-year teacher preparation program and worked in an exceptionally challenging school with limited opportunities for professional development. Given her background and teaching context, one might expect her to express only moderate job satisfaction, success teaching a diverse population of students, and intentions to remain in the teaching profession. In fact, when she completed the FIRSTMATH NTQ early in the academic year, Stacey reported some hesitation as to whether or not she intended to remain in the teaching profession. However, after her follow-up interview in April, I asked Stacey if she would be available for me to reach out to her again in the event that I had clarifying questions. She responded that she planned to be teaching at the same school the next year. Specifically, she stated "I'm not going anywhere."

This study reveals that the reasons Stacey may not quite fit expectations can be linked to her strong beliefs, for example, that her Bengali students could learn mathematics just as well as her white students. Additionally, even though she reported having limited opportunities to learn about strategies to teach pupils with diverse cultural backgrounds, she demonstrated her ability to manage her class with few disruptions, build rapport with her students, plan her lessons according to standards, use complex questioning, and a variety of other pedagogical strategies. In spite of limited formal opportunities to meet with her colleagues, she also reported that her

fellow teachers, her principal, and the school curriculum or standards were very important resources for her.

Furthermore, in spite of her skepticism that the “state can see” what actually happens in the classroom or evaluate it in meaningful ways, Stacey did not seem to be overly concerned about her evaluations. Her confidence may be linked to the fact that her students were, in fact, demonstrating achievement gains. Although these gains were perhaps not at the rate or grade levels set by the state, they did speak to the quality of Stacey’s teaching a diverse population of students. Her success with her students likely contributed to her job satisfaction and intention to remain in the profession.

Joan

One might expect that Joan’s background and teaching context would elicit the highest levels of success teaching diverse students, job satisfaction, and intentions to remain in the teaching profession. Like Stacey, she completed a five-year university teacher preparation program, but taught in a somewhat more advantaged context. She did, in fact, report plans to remain in the teaching profession; however, her intentions may have had more to do with her personal background. For example, Joan entered the profession later in life and expressed that she planned to continue, in part to secure her retirement.

However, Joan did not demonstrate success in the classroom with diverse students in spite of reporting that she felt very prepared to teach diverse students and had numerous opportunities to learn how to teach diverse students. In fact, she struggled tremendously to manage student disruptions and effectively teach students with a range of challenges, including emotional impairments. In addition, she did not report a high level of job satisfaction as expected. Indeed, she expressed frustration with barriers such as time available to plan lessons

with her co-teacher and lack of support from in-class special educators. These factors seemed to contribute to a sense of powerlessness on Joan's part regarding her ability to meet the needs of her students. Similar to Stacey, she reported that her fellow teachers and the school curriculum or standards were very important teaching resources. She also reported that her school's in-service professional development activities were very important resources.

Joan also reported feeling stress as a result of teacher evaluation policies and appeared to waiver in her determination of whether or not the system of teacher evaluation was fair. At the same time, she suggested that her positive working relationship with her principal might shield her from negative repercussions from her evaluations. The protection of her administration may have supported her intentions to remain in the teaching profession.

Steve

One might expect Steve to have considerable success in the classroom, high job satisfaction, and strong intentions to remain in teaching. After all, compared to the other teachers in this study, he worked in the most favorable conditions; his school facilities were state-of-the-art and he reported having numerous professional development opportunities that perhaps could help to make up for his lack of extensive teacher preparation. In the observed lesson, he also taught a small group of students with limited diversity.

Yet even in this favorable context, Steve seemed to lack affection for his students. For example, he often commented on their lack of respect for adults, lack of motivation to perform well on assessments, and a need to "vent" about their behavior with other teachers. He even pointed to his students' lack of motivation and low test scores as the reason for his falling evaluation scores. Also, he was the only teacher who expressed agreement with the idea that some ethnic groups are better than others at learning mathematics. However, like Joan, he

seemed to suggest that administrators at his school could see his efforts in the classroom to boost student scores and would take those efforts into account in the final analysis of his performance.

His classroom performance, however, did not seem to offer many redeeming qualities. For instance, Steve did not refer to standards in his lesson planning or engage in questioning strategies that may have facilitated student learning. Furthermore, while he did express the intention to make his lessons relevant to the students in his class, he later commented that he had done nothing to make the lesson relevant. Steve's moderate job satisfaction and intentions to remain in the teaching profession appear to have more to do with his experiences in the classroom than the quality of his facilities and professional development opportunities.

Jillian

Jillian is a teacher that is perhaps best aligned with expectations. She was prepared to teach in a post-graduate program that, according to her reports, did not offer any opportunities to learn strategies to teach students with a range of challenging characteristics. As a result, she also reported feeling ill-prepared to perform even basic teaching activities such as set up learning activities and work collaboratively with other teachers. In addition, Jillian worked in the most disadvantaged school in the study, characterized by extremely limited resources and low performing students. Indeed, she expressed that she was trying to scaffold some of her middle school students to grade level from a third-grade level in mathematics and reported that her most important resources for teaching were her own.

Not surprisingly, Jillian expressed minimal success in her teaching and low job satisfaction. While she did not express low intentions to remain in teaching, she did, in fact, resign her position at the school in search of other teaching opportunities. Yet, like the other teachers, it was her experiences in the classroom that seemed to inform her decision to teach

elsewhere. Her classroom observation, for example, revealed her struggle to manage a class of diverse students who disrupted her lesson on multiple occasions. These disruptions happened in spite of her efforts to make the lesson relevant by using examples that students would find familiar and striving to develop relationships with and among students through her classroom organization.

What Matters Most for Novice Mathematics Teachers' Satisfaction and Retention?

Ball and colleagues argued that education researchers need to “take context seriously” since it is an “active force” that influences the ways in which education policies are implemented (Braun et al., 2011). While the *material* context is important in that it can limit administrators' capacity to provide working conditions that might attract and develop the most well-qualified novice teachers, the teachers in this study pointed to the *professional* context as a stronger influence on their success, satisfaction, and retention.

Jillian provides perhaps the most striking evidence. Feeling like an “island” in her school, Jillian's experience points to the devastating impact on novice teachers of working in a context void of meaningful opportunities to engage with colleagues. Recent research suggests that the school characteristics most important to teachers, and the best predictors of job satisfaction and intent to remain in the teaching profession, are largely social (e.g., collegial relationships, principal leadership, trust, respect, and openness) in nature (Allensworth et al., 2009; Johnson et al., 2012). Having virtually no opportunities to establish relationships, collaborate, and secure support from her colleagues and administrators left Jillian extremely frustrated with her teaching experience and looking for opportunities in other schools.

Experiences of the novice middle school mathematics teachers in this study point to the importance of strong *professional* contexts to address the challenges they faced from the *situated*

contexts of their schools. Specifically, Joan expressed acute challenges related to effectively teaching students with emotional impairments without adequate time to plan and discuss lessons with her co-teacher. While Joan's school provided far more opportunities for professional development – opportunities that Joan identified as important resources for her teaching – the immediate teaching challenges she faced with students from a wide range of ability levels seemed to have a greater influence on her feelings of success and job satisfaction.

Achinstein et al. (2004) argued that novice teachers' backgrounds are also influential in shaping their teaching experiences. For example, the authors illustrated the ways in which teachers' backgrounds guided their worldviews and their "apprenticeship of observation" (Lortie, 1975). The data from teachers in this study support these claims. For example, Steve grew up in a context in which he developed strong beliefs about the proper level of respect that students should demonstrate for teachers. In several interview comments he pointed to a perceived decrease in student respect for teachers over the years, which seemed to be linked to his feelings of frustration that his students did not apply themselves in a way that would improve their test scores and his annual evaluation results. Perhaps if it were not for the shelter he and other teachers seemed to receive from their administrators regarding their evaluations, Steve's overall level of job satisfaction might have been considerably lower.

Finally, all of the teachers expressed the view – best expressed by Stacey – that the "state can't see" what actually takes place in the classroom. They felt that Michigan's teacher evaluation reforms narrowed the definition of teacher effectiveness to a tighter focus on student test scores, ignoring a host of other important measures of effective teaching (e.g., students' engagement and social development) and the challenges that teachers faced in the classroom. These teachers' experiences correspond to Kennedy's (2005) argument that policymakers should

better align their reforms with the realities of the classroom to make them more effective. Furthermore, the teachers suggested that their evaluations failed to capture the achievement growth that was occurring; in other words, while students may not have achieved state proficiency levels, they were improving. The outcomes of these evaluations, according to Joan, were always stress-inducing for novice teachers because their positions were the least certain.

Here, it is also important to identify the factors that seemed to matter less to the success, satisfaction, and retention of the teachers in this study. According to teachers' responses on the FIRSTMATH NTQ, it is clear that they did not look to their teacher preparation programs as a resource for their teaching. In fact, with the exception of Steve (who reported that every possible resource was "very important" for his teaching) none of the teachers considered their preparation program or the professors from their program more than "somewhat important." This is interesting given the fact that most of the teachers worked in schools that, according to their own reports, had few professional development or collaboration opportunities that might have served as resources for their teaching. In fact, absent nearly all resources, Jillian placed the highest importance on her own resources.

Perhaps the lack of importance placed on resources from teacher preparation programs can be attributed to the fact that all of these teachers, except Joan, had been teaching for three years, a considerable time away from association with social networks from their preparation institution. Joan's experience seems to corroborate the fact that time appears to be a significant reason for teachers' looking elsewhere for support. As a novice teacher in her first year of teaching, Joan rated resources from her teacher preparation program higher than the other teachers. These findings suggest that stronger and sustained linkages between preparation

programs, novice teachers, and the schools that employ them might prove to be valuable resources for beginning teachers as they struggle to “survive” their first years in the classroom.

The most recent teaching standards from the Interstate Teacher Assessment and Support Consortium (InTASC, 2011), which most teacher preparation programs aspire to meet, appear to recognize the challenges faced by novice teachers. Through explicit emphasis on elements such as personalized learning for diverse learners, collaborative professional culture, and leadership roles for teachers and administrators, these standards (to the extent that they are included in teacher preparation and supported in schools) serve as a promising plan to enhance the experiences of novice teachers.

Novice Teacher Recruitment and Retention

The findings that novice teachers struggle to “manage” and “survive” as they juggle the competing demands of learning the cultures and norms of their schools and attending to the learning needs of a diverse population of students, all while meeting the requirements of shifting reforms and accountability policies, are not new. In fact, numerous scholars over the past three decades have illustrated the challenges faced by novice teachers (e.g., Berliner, 2001; Johnson, 2004; Kennedy, 2005; Lortie, 1975). Analyzing a unique set of content-specific data from a focused group of novice middle school teachers of mathematics, this study reinforces these earlier studies in pointing to a need for better understanding the experiences of novice teachers in an effort to develop education policies to recruit and retain effective novice teachers for the most marginalized children.

The twin goals of recruitment and retention are inextricably linked; retaining effective novice teachers in “hard to staff” schools, for example, minimizes pressure to continually recruit teachers for such schools. Policies aimed at improving these two goals are often difficult to

distinguish in that they often address similar policy levers to ultimately improve the job satisfaction and working conditions of novice teachers (Guarino et al., 2006). According to Guarino et al. (2006), many of these policies focus on in-service novice teachers and areas like induction and mentoring programs, class sizes, and collegial support. Indeed, as noted earlier, recent research suggests that these activities are most important to teachers' satisfaction and retention (Allensworth et al., 2009; Johnson et al., 2012).

Yet any efforts to improve teacher recruitment and retention operate in a context of increasing accountability reforms. The findings of this study highlight a dilemma in that accountability policies, which are ostensibly designed to increase student learning in the most underserved schools, impose disproportionate burdens on the novice teachers who tend to work in them by demanding that novices perform to the same standards as experienced teachers, but with fewer resources to meet such expectations. This study also begins to reveal that in addition to the social environment of schools, factors having to do with teachers' immediate practices (e.g., ability to manage classroom, plan and deliver effective lessons, and improve student learning) are powerful influences on how successful they feel as teachers and may, in turn, affect their long-term intentions to stay in teaching.

Policymakers developing reforms aimed at improving teacher quality as a strategy for improving student achievement outcomes should carefully consider the ways in which novice teachers' backgrounds and school contexts mediate accountability policy enactment in schools serving the most marginalized students. In addition, this study reveals that perhaps policymakers concerned about developing and retaining quality teachers for marginalized students should pay even more attention to supporting the development of novice teachers' practices, since they may

have more influence on teachers' success in teaching diverse students, their job satisfaction, and their intentions to remain in the profession.

Implications for Research

The strength of this study lies in the depth of qualitative information collected on a limited number of cases. Approaching the research questions with this volume of information allowed a deeper understanding of the ways in which various teacher backgrounds, teaching contexts, and practices were related to teachers' job satisfaction and intentions to remain in teaching. Furthermore, generalizing to the policy enactment (Ball, 1998) and socialization (Achinstein et al., 2004) theories, this study provides additional support for the frameworks using a different population (e.g., novice middle school mathematics teachers) and unique data (e.g., novice teacher beliefs about teaching and learning mathematics, preparedness to teach, and opportunities to learn). Of course, additional research in other country contexts would further test and inform these theories.

Limitations

This study is limited by four important factors. First, although the FIRSTMATH instruments used collected a great deal of meaningful information on the novice middle school teachers studied, they were part of the FIRSTMATH proof-of-concept study intended to test the instruments and the procedures for administration on a small sample of novice mathematics teachers. Second, the data collected was cross-sectional. Indeed, as planned for the larger study, more in-depth longitudinal questionnaires and interviews of administrators and novice teachers regarding perceptions of educational policies, school conditions, and practices are needed to understand how these factors influence teachers' actual decisions to remain in the teaching profession. Third, to describe the contexts of schools, this study relied on state-level documents

and teachers' perceptions, but not school-level data from administrators. The larger study will collect this data as new instruments have been developed but for this dissertation the lack of data regarding administrators' efforts to improve school contexts and support the development of novice teachers would have been helpful to corroborate teachers' accounts.

Future Research

Many policies aim to improve the preparation, recruitment, and development of novice teachers who are effective in teaching increasingly diverse populations of students. Yet these efforts are inconsequential if novice teachers do not remain in the teaching profession. Additionally, the marginalization experienced by students with differing cultural and linguistic backgrounds or low socioeconomic status begins at an early age in the U.S. and other countries. Therefore, in my future research, I hope to also study the ways in which novice teacher backgrounds and school contexts interact to influence teaching and retention in challenging schools at the elementary level in the U.S. and internationally. The design of this research should be longitudinal, include data collected at the school, teacher, and student levels, and utilize mixed-method analyses.

REFERENCES

REFERENCES

- Achinstein, B. & Ogawa, R. T. (2011). *Change(d) agents: New teachers of color in urban schools*. New York: Teachers College Press.
- Achinstein, B. & Ogawa, R. T. (2012). New teachers of color and culturally responsive teaching in an era of educational accountability: Caught in a double bind. *Journal of Educational Change*, 13, 1-39.
- Achinstein, B., Ogawa, R. T., Sexton, D. & Freitas, C. (2010). Retaining teachers of color: A pressing problem and a potential strategy for “hard-to-staff” schools. *Review of Educational Research* 80(1), 71-107.
- Achinstein, B., Ogawa, R. T. & Speiglmán, A. (2004). Are we creating separate and unequal tracks of teachers? The effects of state policy, local conditions, and teacher characteristics on new teacher socialization. *American Education Research Journal*, 41(3), 557-603.
- Akiba, M. & LeTendre, G. (2009). *Improving teacher quality: The U.S. teaching force in global context*. New York: Teachers College Press.
- Allensworth, E., Ponisciak, S., & Mazzeo, C. (2009). *The schools teachers leave: Teacher mobility in Chicago Public Schools*. Chicago: Consortium on Chicago School Research - University of Chicago.
- American Education Research Association. (2006). Standard for reporting on empirical social science research in AERA publications. *Educational Researcher*, 35(6), 33-40.
- Anagnostopolous, D. (2009). The new accountability and teachers’ work in urban high schools in the USA. In M. T. Tatto (Ed.) *Reforming teaching globally* (pp. 119-138). Charlotte, NC: Information Age.
- Anagnostopolous, D. & Rutledge, S. A. (2007). Making sense of school sanctioning: Policies in urban high schools. *Teachers College Record*, 109(5), 1261-1302.
- Anderson-Levitt, K. (2003). *Local meanings, global schooling*. K. Anderson-Levitt (Ed.). New York: Palgrave MacMillan.
- Arellano, A., Bedi, S. & Gallaher, T. (2016). *Michigan’s talent crisis: The economic case for rebuilding Michigan’s broken public education system*. The Education Trust-Midwest. Retrieved from https://midwest.edtrust.org/wp-content/uploads/sites/2/2013/10/MIAchieves2016_5-15-16WEB.pdf.
- Arsen, D. & Ni, Y. (2012). The effects of charter school competition on school district resource allocation. *Education Administration Quarterly*, 48(1), 3-38.

- Baker, D. P. & LeTendre, G. K. (2005). *National differences, global similarities: World Culture and the future of schooling*. Palo Alto: Stanford University Press.
- Ball, D. L., Lubienski, S. & Mewborn, D. (2001). Research on teaching mathematics: The unsolved problem of teachers' mathematical knowledge. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed.) (pp. 433-456). New York: MacMillan.
- Ball, D. L., Thames, M. H. & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, 59(5), 389-407.
- Ball, S. J. (1998). Big policies/small world: An introduction to international perspectives in education policy. *Comparative Education*, 34(2), 119-130.
- Ball, S. J. (2003). The teacher's soul and the terrors of performativity. *Journal of Education Policy*, 18(2), 215-228.
- Ball, S. J., Maguire, M., Braun, A. & Hoskins, K. (2011). Policy actors: Doing policy work in schools. *Discourse: Studies in the Cultural Politics of Education*, 32(4), 625-639.
- Barber, M. & Mourshed, M. (2007). *How the world's best-performing school systems come out on top*. McKinsey & Company.
- Berliner, D. (2001). Teacher expertise. In F. Banks & A. S. Mayes (Ed.), *Early professional development for teachers* (pp. 20-27). London: David Fulton.
- Berliner, D. C. & Biddle, B. J., (1995). *The manufactured crisis: Myths, fraud, and the attack on America's public schools*. Reading, Massachusetts: Addison-Wesley.
- Borman, G. D. & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research*, 78(3), 367-409
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.
- Boyd, D., Lankford, H., Loeb, S. & Wyckoff, J. (2005a). Explaining the short careers of high-achieving teachers in schools with low-performing students. *The American Economic Review*, 95(2), 166-171.
- Boyd, D., Lankford, H., Loeb, S. & Wyckoff, J. (2005b). The draw of home: How teachers' preferences for proximity disadvantage urban schools. *Journal of Policy Analysis and Management*, 24(1), 113-132.
- Bourdieu, P. (1973). Cultural reproduction and social reproduction. In R. Brown (Ed.), *Knowledge, education and cultural change: Papers in the sociology of education* (pp.71-112). London: Tavistock.

- Braun, A., Ball, S. J., Maguire, M. & Hoskins, K. (2011). Taking context seriously: Towards explaining policy enactments in the secondary school. *Discourse: Studies in the Cultural Politics of Education*, 32(4), 585-596.
- Broughman, S. & Rollefson, M. (2000). Teacher supply in the United States: Sources of newly hired teachers in public and private schools: 1987–88 to 1993–94. *Education Statistics Quarterly*, 2(3), 28–32.
- Brown, C. P. (2015). Taking and teaching the test are not the same: A case study of first-year teachers' experiences in high-stakes contexts. *Teachers and Teaching: Theory and Practice*, 21(8), 1026-1044.
- Bryk, A. S. & Schneider, B. (2002). *Trust in schools: A core resource for improvement*. New York: Russell Sage Foundation.
- Burns, T. & Shadoian-Gersing, V. (2010). The importance of effective teacher education for diversity. In *Educating teachers for diversity: Meeting the challenge* (pp. 19-40). Paris: OECD Publishing.
- Chabbot, C. & Ramirez, F. O. (2000). Development and education. In M. Hallinan (Ed.), *Handbook of the Sociology of Education* (pp. 163-187). New York: Kluwer Press.
- Chubbuck, S. M., Clift, R. T., Allard, J. & Quinian, J. (2001). Playing it safe as a novice teacher: Implications for programs for new teachers. *Journal of Teacher Education*, 52(5), 365-376.
- Clotfelter, C. T., Ladd, H. F. & Vigdor, J. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review*, 24(4), 377–92.
- Clotfelter, C., Ladd, H., Vigdor, J., & Diaz, R. (2004). Do school accountability systems make it more difficult for low-performing schools to attract and retain high-quality teachers? *Journal of Public Policy Analysis and Management*, 23(2), 251–271.
- Coburn, C. E. (2001). Collective sensemaking about reading: How teachers mediate reading policy in their professional communities. *Educational Evaluation and Policy Analysis*, 23(2), 145–170.
- Coburn, C. E. (2004). Beyond decoupling: Rethinking the relationship between the institutional environment and the classroom. *Sociology of Education*, 77, 211-244.
- Coburn, C. E., Mata, W. S. & Choi, L. (2013). The embeddedness of teachers' social networks: Evidence from a study of mathematics reform. *Sociology of Education*, 86(4), 311-342.
- Coburn, C. E. & Russell, J. L. (2008). District policy and teachers' social networks. *Educational Evaluation and Policy Analysis*, 30(3), 203-235.

- Cochran-Smith, M. (2004). Stayers, leavers, lovers, and dreamers: Insights about teacher retention. *Journal of Teacher Education*, 55(5), 387-392.
- Cohen, D. K. & Ball, D. L. (1990). Policy and practice: An overview. *Educational Evaluation and Policy Analysis*, 12(3), 233-239.
- Cohen, D. K. & Hill, H. C. (2000). Instructional policy and classroom performance: The mathematics reform in California. *Teachers College Record*, 102(2), 294-343.
- Cohen-Vogel, L., & Smith, T. M. (2007). Qualifications and assignments of alternatively certified teachers: Testing core assumptions. *American Educational Research Journal*, 44(3), 732-753.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, (Supplement 1988): S95-S120.
- Common Core State Standards Initiative. (2016). About the standards. Retrieved from <http://www.corestandards.org/about-the-standards/>.
- Corbett, H. D., & Wilson, B. (1991). *Testing, reform and rebellion*. Norwood, NJ: Ablex.
- Cowen, J., Creed, B. & Keesler, V. (2015). Dynamic participation in inter-district open enrollment: Evidence from Michigan 2005-2013. Working Paper#49. Education Policy Center, Michigan State University.
- Cuban, L. (1993). *How teachers taught: Constancy and change in American classrooms 1890-1990*. New York: Teachers College Press.
- Darling-Hammond, L. (2007a). Recruiting and retaining teachers: What matters most and what can government do? Washington, D.C.: The Forum for Education and Democracy.
- Darling-Hammond, L. (2007b). Race, inequality, and educational accountability: The irony of 'No Child Left Behind'. *Race, Ethnicity, and Education*, 10(3), 245-260.
- Darling-Hammond, L. (2015). Can value added add value to teacher evaluation? *Educational Researcher*, 44(2), 132-137.
- Darling-Hammond, L. & Sykes, G. (2003). Wanted: A national teacher supply policy for education: The right way to meet the "Highly Qualified Teacher" challenge. *Education Policy Analysis Archives*, 11(33), 1-55.
- Dee, T. S. (2004). Teachers, race, and student achievement in a randomized experiment. *The Review of Economics and Statistics*, 86(1), 195-210.
- Dee, T. S. (2005). A teacher like me: Does race, ethnicity, or gender matter? *American Economic*

- Review*, 95(2), 158–165.
- DeSimone, J. R. & Parmar, R. S. (2006). Middle school mathematics teachers' beliefs about inclusions of students with learning disabilities. *Learning Disabilities Research and Practice*, 21(2), 98-110.
- Diamond, J. D. & Spillane, J. P. (2004). High stakes accountability in urban elementary schools: Challenging or reproducing inequality? *Teachers College Record*, 106(6), 1145-1176.
- Doherty, K. M. & Jacobs, S. (2015). *State of the states 2015: Evaluating teaching, leading, and learning*. National Council on Teacher Quality.
- Duncan, A. (2010). Secretary Arne Duncan's remarks at OECD's release of the Program for International Student Assessment (PISA) 2009 results. U.S. Department of Education. Retrieved from <http://www.ed.gov/news/speeches/secretary-arne-duncans-remarks-oecd-release-program-international-student-assessment->.
- Egalite, A. J., Kisida, B. & Winters, M. A. (2015). Representation in the classroom: The effect of own-race teachers on student achievement. *Economics of Education Review*, 45, 44-52.
- Emmer, E. T. & Stough, L. M. (2001). Classroom management: A critical part of educational psychology, with implications for teacher education. *Educational Psychologist*, 36(2), 103-112.
- Feng, L. & Sass, T. (2011). Teacher quality and teacher mobility. National Center for Analysis of Longitudinal Data in Education Research. Working Paper 57. Retrieved from http://www.caldercenter.org/sites/default/files/CALDERWorkPaper_57.pdf.
- Figlio, D. (2006). Testing, crime and punishment. *Journal of Public Economics*, 90(4–5), 837–851.
- Figlio, D. & Loeb, S. (2011). School Accountability. In E. A. Hanushek, S. Machin, and L. Woessmann (Eds), *Handbooks in Economics*, Vol. 3 (pp 383-421). Netherlands: North-Holland.
- Figlio, D. & Winicki, J. (2005). Food for thought: The effects of school accountability plans on school nutrition. *Journal of Public Economics*, 89(2–3), 381–394.
- Frank, K. A., Zhao, Y. & Borman, K. (2004). Social capital and the diffusion of innovations within organizations: The case of computer technology in schools. *Sociology of Education*, 77(2), 148–171.
- Gallucci, C. (2003). Communities of practice and the mediation of teachers' responses to standards-based reform. *Education Policy Analysis Archives*, 11(35), 1-30.

- Gates, B. (2009). Bill Gates' talk on mosquitoes, malaria, and education. Retrieved from http://blog.ted.com/2009/02/11/bill_gates_talk/
- George W. Bush Institute. (2016). Global report card. Retrieved from <http://globalreportcard.org/map.html>.
- Goldhaber, D., Choi, H. & Cramer, L. (2007). A descriptive analysis of the distribution of NBPTS-certified teachers in North Carolina. *Economics of Education Review*, 26(2), 160–72.
- Goldhaber, D. & Walch, J. (2014). Gains in teacher quality. *Education Next*, 14(1), 39-45.
- Guarino, C. M., Santibanez, L. & Daley, G. A. (2006). Teacher recruitment and retention: A review of the recent empirical literature. *Review of Educational Research*, 76(2), 173-208.
- Hanushek, E. A., Kain, J. F. & Rivkin, S. G. (2004). Why public schools lose teachers. *Journal of Human Resources*, 39(2), 326–354.
- Henke, R., Chen, X., Geis, S. & Knepper, P. (2000). *Progress through the teacher pipeline: 1992–93 college graduates and elementary/secondary teaching as of 1997*. Washington, DC: National Center for Education Statistics.
- Hirsch, E., Koppich, J., & Knapp, M. (2001). *Revisiting what states are doing to improve the quality of teaching: An update on patterns and trends*. Seattle, WA: Center for the Study of Teaching and Policy, University of Washington.
- Humphrey, D. C., & Wechsler, M. E. (2007). Insights into alternative certification: Initial findings from a national study. *Teachers College Record*, 109(3), 483–530.
- Imazeki, J. (2005). Teacher salaries and teacher attrition. *Economics of Education Review*, 24(4), 431–449.
- Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, 38(3), 499-534.
- Ingersoll, R. (2002). The teacher shortage: A case of wrong diagnosis and wrong prescription. *The NASSP Bulletin*, 86, 16-31.
- Ingersoll, R. (2003). *Is there really a teacher shortage?* A report co-sponsored by the Center for the Study of Teaching and Policy and the Center for Policy Research in Education. Seattle: University of Washington, Center for the Study of Teaching and Policy.
- Ingersoll, R. (2004). Four myths about America's teacher quality problem. In M. Smylie & D. Miretzky (Eds.), *Developing the teacher workforce: The 103rd yearbook of the*

- National Society for the Study of Education* (pp. 1-33). Chicago: University of Chicago Press.
- Ingersoll, R. (2012). Beginning teacher induction: What the data tell us. *Phi Delta Kappan*, 93(8), 47-51.
- Ingersoll, R. M. & Kralik, J. M. (2004). The impact of mentoring on teacher retention: What the research says (ECS Research Review). Denver, CO: Educational Commission of the States.
- Ingersoll, R. & May, H. (2010). *The magnitude, destination, and determinants of mathematics and science teacher turnover*. Consortium for Policy Research in Education. Philadelphia: University of Pennsylvania.
- Ingersoll, R., Merrill, L. & Stuckey, D. (2014). *Seven trends: the transformation of the teaching force, updated April 2014*. CPRE Report (#RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.
- Ingersoll, R. M. & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of Educational Research*, 81(2), 201-233.
- Institute of Educational Sciences. (2014). *State requirements for teacher evaluation policies promoted by Race to the Top*. Retrieved from <https://ies.ed.gov/ncee/pubs/20144016/pdf/20144016.pdf>
- Interstate Teacher Assessment and Support Consortium. (2011). *InTASC: Model core teaching standards: A resource for state dialogue*. Washington, DC: Council of Chief State School Officers.
- Jacob, B. A. (2005). Accountability, incentives and behavior: The impact of high-stakes testing in the Chicago Public Schools. *Journal of Public Economics* 89(5-6), 761-796.
- Jennings, J. L., & Bearak, J. M. (2014). "Teaching to the test" in the NCLB era: How test predictability affects our understanding of student performance. *Educational Researcher*, 43(8), 381-389.
- Jensen, B., Sandoval-Hernandez, A., Knoll, S. & Gonzalez, E. J. (2012). *The experience of new teachers: Results from TALIS 2008*. Paris: OECD Publishing.
- Johnson, S. M. (2004). *Finders and keepers: Helping teachers survive and thrive in our schools*. San Francisco: Jossey-Bass.
- Johnson, S. M. (2006). *The workplace matters: Teacher quality, retention, and effectiveness*. Washington, DC: National Educational Association.

- Johnson, S. M. (2012). Having it both ways: Building the capacity of individual teachers and their schools. *Harvard Educational Review*, 82(1), 107-122.
- Johnson, S. M., Berg, J. H. & Donaldson, M. L. (2005). *Who stays in teaching and why: A review of the literature on teacher retention*. Project on the Next Generation of Teachers. Cambridge, MA: Harvard Graduate School of Education.
- Johnson, S. M. & Birkeland, S. E. (2003). Pursuing a “sense of success”: New teachers explain their career decisions. *American Education Research Journal*, 40(3), 581-617.
- Johnson, S. M., Kraft, M. & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers’ working conditions on their professional satisfaction and their students’ achievement. *Teachers College Record*, 114(10), 1–39.
- Kardos, S. M. & Johnson, S. M. (2010). New teachers’ experiences of mentoring: The good, the bad, and the inequity. *Journal of Educational Change*, 11, 23-44.
- Kee, A. N. (2012). Feelings of preparedness among alternatively certified teachers: What is the role of program features? *Journal of Teacher Education*, 63(1), 23–38.
- Kennedy, M. M. (2005). *Inside teaching: How classroom life undermines reform*. Cambridge, Massachusetts: Harvard University Press.
- Klees, S. J. (2008). A quarter century of neoliberal thinking in education: Misleading analyses and failed policies. *Globalisation, Societies, and Education*, 6(4), 311-348.
- Klein, J. (2011). The failure of American schools. *The Atlantic*. Retrieved from <http://www.theatlantic.com/magazine/archive/2011/06/the-failure-of-american-schools/308497/>.
- Klopfenstein, K. (2005). Beyond test scores: The impact of black teacher role models on rigorous math taking. *Contemporary Economic Policy*, 23(3), 416–428.
- Kozol, J. (1991). *Savage inequalities*. New York: Crown.
- Kraft, M. A., Papay, J. P., Charner-Laird, M., Johnson, S. M., Ng, M. & Reinhorn, S. K. (2012). *Committed to their students, but in need of support: How school context influences teacher turnover in high-poverty, urban schools*. Project on the Next Generation of Teachers. Harvard Graduate School of Education.
- Kumar, R. & Hamer, L. (2013). Preservice Teachers’ Attitudes and Beliefs Toward Student Diversity and Proposed Instructional Practices A Sequential Design Study. *Journal of Teacher Education*, 64(2), 162-177.
- Lankford, H., Loeb, S. & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis*, 24(1), 37–62.

- Leech, N. L. & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School Psychology Quarterly*, 22(4), 557-584.
- Lipsky, M. (1980). *Street-level bureaucracy*. New York: Russell Sage.
- Liu, E., Rosenstein, J., Swann, A., & Khalil, D. (2008). When districts encounter teacher shortages? The challenges of recruiting and retaining math teachers in urban districts. *Leadership and Policy in Schools*, 7(3), 296-323.
- Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teacher conditions predict teacher turnover in California Schools. *Peabody Journal of Education*, 80(3), 44-70.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. London: University of Chicago Press.
- Lucas, T., Villegas, A. M., Freedson-Gonzalez, M. (2008). Linguistically responsive teacher education: Preparing classroom teachers to teach English Language Learners. *Journal of Teacher Education*, 59(4), 361-373.
- Malen, B. (2003). Tightening the grip? The impact of state activism on local school systems. *Educational Policy*, 17(2), 195-216.
- Malen, B., Croninger, R. C., Redmond Jones, D., & Muncey, D. (1999, October). Uncovering the potential contradictions in reconstitution reforms. Paper presented at the annual conference of the University Council for Educational Administration, Minneapolis.
- Maxwell, L. A. (2014). U.S. school enrollment hits majority-minority milestone. *Education Week*. Retrieved from <http://www.edweek.org/ew/articles/2014/08/20/01demographics.h34.html>.
- McLaughlin, M. W. (1987). Learning from experience: Lessons from policy implementation. *Educational Evaluation and Policy Analysis*, 9(2), 171-178.
- McLaughlin, M. W. & Talbert, J. E. (2001). *Professional communities and the work of high school teaching*. Chicago: University of Chicago Press.
- Mehta, J. (2014). When professions shape politics: The case of accountability in K-12 and higher education. *Educational Policy*, 28(6), 881-915.
- Meyer, J. W., Ramirez, F. O., & Soysal, Y. N. (1992). World expansion of mass education, 1870-1980. *Sociology of Education*, 65(2), 128-149.
- Michigan Council for Educator Effectiveness. (2013). *Building an improvement-focused system of educator evaluation in Michigan: Final recommendations*. Retrieved from <http://www.mcede.org/reports>.

- Michigan Department of Education. (n.d.). *Michigan educator evaluations at-a-glance*. Retrieved from http://www.michigan.gov/documents/mde/Educator_Evaluations_At-A-Glance_522133_7.pdf.
- Michigan Department of Education. (2014a). *Common Core Standards Fact Sheet*. Retrieved from http://www.michigan.gov/documents/mde/CCS_Rigor_420777_7.pdf
- Michigan Department of Education. (2014b). *Michigan school accountability scorecards: 2014 at a-glance overview*. Retrieved from http://www.michigan.gov/documents/mde/Accountability_Scorecards_At-A-Glance_425302_7.pdf
- Michigan Department of Education. (2014c). *2014 Michigan school accountability scorecards: Summary characteristics*. Retrieved from http://www.michigan.gov/documents/mde/Scorecard_Brief_465181_7.pdf.
- Michigan Department of Education. (2015a). *Public act 173*. Retrieved from <http://www.legislature.mi.gov/documents/2015-2016/publicact/pdf/2015-PA-0173.pdf>.
- Michigan Department of Education. (2015b). *Michigan educator evaluations at-a-glance*. Retrieved from http://www.michigan.gov/documents/mde/Educator_Evaluations_At-A-Glance_522133_7.pdf
- Michigan Department of Education. (2015c). *MDE fast facts 2014-2015: Statistics for Michigan schools*. Retrieved from https://www.michigan.gov/documents/mde/MDE_Fast_Fact_379573_7.pdf
- Michigan Department of Education. (2016a). *School choice*. Retrieved from http://www.michigan.gov/mde/0,1607,7-140-6530_30334-106922--,00.html
- Michigan Department of Education. (2016b). *Guidance handbook for educators of English learners with suspected disabilities*. Retrieved from http://www.michigan.gov/documents/mde/Guidance_Handbook_for_Educators_of_English_Learners_with_Suspected_Disabilities_-_January_2016_515881_7.pdf.
- Michigan Department of Education. (2016c). *MI school data*. Retrieved from <https://www.mischooldata.org/Default.aspx>
- Michigan State University. (2016). *ASSIST beginning teachers*. Retrieved from <http://assist.educ.msu.edu/ASSIST/index.php?tab=4>.
- Mihalas, S., Morse, W. C., Allsopp, D. H., McHatton, P. A. (2008). Cultivating caring relationships between teachers and secondary students with emotional and behavioral disorders: Implications for research and practice. *Remedial and Special Education*, 30, 108-125.

- Miller, P. C., & Endo, H. (2005). Journey to becoming a teacher: The experiences of students of color. *Multicultural Education*, 13(1), 2–9.
- Milner, H. R. (2006). The promise of black teachers' success with black students. *Educational Foundations*, 20(34), 89–104.
- Mourshed, M., Chijioke, C., & Barber, M. (2010). *How the world's most improved school systems keep getting better*. McKinsey & Company.
- Murnane, R. J., Singer, J. D., Willett, J. B., Kemple, J. J., & Olsen, R. J. (1991). *Who will teach? Policies that matter*. Cambridge, MA: Harvard University Press.
- National Academy of Sciences. (2007). *Rising above the gathering storm: Energizing and employing America for a brighter economic future*. Washington, DC: National Academies Press.
- National Academy of Sciences. (2010). *Rising above the gathering storm, revisited: Rapidly approaching category 5*. Washington, DC: National Academies Press.
- National Center for Education Statistics. (2015). *State education data profiles: Michigan*. Retrieved from <http://nces.ed.gov/programs/stateprofiles/sresult.asp?mode=full&displaycat=1&s1=26>
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: Government Printing Office.
- National Research Council. (2002). *Learning and understanding: Improving advanced study of mathematics and science in U.S. schools*. Washington, DC: National Academies Press.
- National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: Author.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.
- OECD. (2005). *Teachers matter: Attracting, developing, and retaining effective teachers*. OECD Publishing: Paris.
- OECD. (2013a). *PISA 2012 results: What makes schools successful? Resources, policies, and practices (volume IV)*. Paris: OECD.
- OECD. (2013b). *Teachers for the 21st century: Using evaluation to improve teaching*. Paris: OECD.
- Odden, A. R. (1991). The evolution of education policy implementation. In A.R. Odden (Ed.),

- Education policy implementation* (pp. 1-12). Albany: State University of New York Press.
- Ogawa, R. T., Sandholtz, J. H., Martinez-Flores, M., & Scribner, S. (2003). The substantive and symbolic consequences of a district's standards-based curriculum. *American Educational Research Journal*, 40, 147–156.
- Partnership for 21st Century Skills. (2008). *21st century skills, education, and competitiveness: A resource and policy guide*. Retrieved from http://www.p21.org/storage/documents/21st_century_skills_education_and_competitiveness_guide.pdf
- Patton, M. Q. (2002). *Qualitative research & evaluative methods*. Thousand Oaks: Sage.
- Podgursky, M., Monroe, R. & Watson, D. (2004). The academic quality of public school teachers: An analysis of entry and exit behavior. *Economics of Education Review*, 23, 507–518.
- Pogodzinski, B. (2012). Socialization of novice teachers. *Journal of School Leadership*, 22, 982-1023.
- Pogodzinski, B., Youngs, P., Frank, K. A. & Belman, D. (2012). Administrative climate and novices' intent to remain teaching. *The Elementary School Journal*, 113(2), 252-275.
- Porter, A. C. (1989). A curriculum out of balance: The case of elementary school mathematics. *Educational Researcher*, 18(5), 9-15.
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1-24.
- Ragin, C. C. (1992). Introduction: Cases of “what is a case?” In C. C. Ragin & H. S. Becker (Eds.) *What is a case?* (pp. 1-18). Cambridge: Cambridge University Press.
- RAND. (2012). Teachers matter: Understanding teachers' impact on student achievement. RAND Education. Retrieved from http://www.rand.org/content/dam/rand/pubs/corporate_pubs/2012/RAND_CP693z1-2012-09.pdf.
- Redding, C. & Smith, T. A. (2016). Easy in, easy out: Are alternatively certified teachers turning over at increased rates? *American Educational Research Journal*, 1-40.
- Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417-458.
- Robertson, S.L. (2012). Placing teachers in global governance agendas. *Comparative Education Review*, 56(4), 584-607.

- Samoff, J. (2012). More of the same will not do: Learning without learning in the World Bank's 2020 Education Strategy. In S. J. Klees, J. Samoff, and N. P. Stromquist (Eds.), *The World Bank and Education: Critiques and Alternatives* (pp. 109-124). Rotterdam, Netherlands: Sense.
- Scafidi, B., Sjoquist, D. L. & Stinebrickner, T. R. (2007). Race, poverty, and teacher mobility. *Economics of Education Review*, 26(2), 145–159.
- Scherrer, J. (2013). The negative effects of student mobility: Mobility as a predictor, mobility as a mediator. *International Journal of Education Policy and Leadership*, 8(1), 1-14.
- Schmidt, W. H., Blomeke, S. & Tatto, M. T. (2011). *Teacher education matters: A study of middle school mathematics teacher preparation in six countries*. New York: Teachers College Press.
- Schmidt, W. H., Tatto, M. T., Bankov, K., Blomeke, S., Cedillo, T., Cogan, L., Han, S. H., Houang, R., Hsieh, F. J., Paine, L., Santillan, M. & Schwille, J. (2007). *The preparation gap: Teacher education for middle school mathematics in six countries – MT21 report*. East Lansing, MI: MSU Center for Research in Mathematics and Science Education.
- Shipp, G. (2011). The politics of educational reform: Idea champions and policy windows. In D. E. Mitchell, R. L. Crowson, and D. Shipp (Eds.), *Shaping education policy: Power and process* (pp. 259-285). New York: Routledge.
- Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–22.
- Simon, N. S. & Johnson, S. M. (2013). Teacher turnover in high-poverty schools: What we know and can do. Working Paper: Project on the Next Generation of Teachers.
- Smarter Balanced Assessment Consortium. (2015). Interim assessments. Retrieved from <http://www.smarterbalanced.org/interim-assessments/>.
- Smith, E. J. & Harper, S. R. (2015). *Disproportionate impact of K-12 school suspension and expulsion on Black students in southern states*. Philadelphia: University of Pennsylvania, Center for the Study of Race and Equity in Education.
- Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal*, 41(3), 681–714.
- Spillane, J. P., Parise, L. M. & Sherer, J. Z. (2011). Organizational routines as coupling mechanisms: Policy, school administration, and the technical core. *American Educational Research Journal*, 48(3), 586-619.

- Spillane, J. P., & Thompson, C. L. (1997). Reconstructing conceptions of local capacity: The local education agency's capacity for ambitious instructional reform. *Educational Evaluation and Policy Analysis*, 19, 185–193.
- Spring, J. (2015). *Globalization of education: An introduction*. New York: Routledge.
- Stanulis, R. N., Burrill, G. & Ames, K. T. (2007). Fitting in and learning to teach: Tensions in developing a vision for a university-based induction program for beginning teachers. *Teacher Education Quarterly*, 135-147.
- Stats America. (2016). *USA states in profile: Michigan profile*. Retrieved from <http://www.statsamerica.org/sip/Default.aspx?ct=S26>.
- Steiner-Khamsi, G. (2012). The global/local nexus in comparative policy studies: analyzing the triple bonus system in Mongolia over time. *Comparative Education*, 48(4), 455-471.
- Strong, M. (2005). Teacher induction, mentoring, and retention: A summary of the research. *New Educator*, 1(3), 181–198.
- Talbert, J. E. (2010). Professional learning communities at the crossroads: How systems hinder or engender change. In A. Hargreaves (Ed.), *Second international handbook of educational change* (pp. 555-571). New York: Springer.
- Tatto, M. T. (2009). Introduction: International comparisons and the global reform of teaching. In M. T. Tatto (Ed.), *Reforming teaching globally* (pp. 7-20). Charlotte, NC: Information Age.
- Tatto, M. T., Schwille, J., Senk, S. L., Ingvarson, L., Peck, R. & Rowley, G. (2008). *Teacher education and development study in mathematics (TEDS-M): Policy, practice, and readiness to teach primary and secondary mathematics – Conceptual framework*. Amsterdam: International Association for the Evaluation of Student Achievement.
- Tatto, M. T., Schwille, J., Senk, S. L., Ingvarson, L., Rowley, G., Peck, R., Bankov, K., Rodriguez, M. & Reckase, M. (2012). *Policy, Practice, and Readiness to Teach Primary and Secondary Mathematics in 17 Countries. Findings from the IEA Teacher Education and Development Study in Mathematics (TEDS-M)*. Amsterdam: International Association for the Evaluation of Student Achievement.
- Tatto, M. T., Rodriguez, M. C., Ingvarson, L. Rowley, G., Maeda, Y., Byun, S. (2013). Development of the TEDS-M Survey Questionnaires. In Tatto, M.T. (Ed.), *The Teacher Education Study in Mathematics (TEDS-M), Technical Report*. Amsterdam, The Netherlands: International Association for the Evaluation of Educational Achievement.
- Tatto, M. T. (2015). The First Five Years of Mathematics Teaching (FIRSTMATH). Proposal written for the EHR Core Research (ECR) Fundamental Research in Science,

- Technology, Engineering and Mathematics (STEM) Education, Program announcement NSF 15-509. East Lansing, MI: College of Education, Michigan State University.
- Tatto, M. T. (2016). The First Five Years of Mathematics Teaching (FIRSTMATH). Final Report to the NSF written for the Research and Evaluation on Education Science and Engineering (REESE), Program solicitation NSF 10-586 [Award No. DRL-0910001, January 2011 to date]. East Lansing, MI: College of Education, Michigan State University.
- Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative Inquiry*, 17(6), 511-521.
- Uline, C. & Tschannen-Moran, M. (2008). The walls speak: The interplay of quality facilities, school climate, and student achievement. *Journal of Educational Administration*, 46(1), 55-73.
- UNESCO. (2014). *Teaching and learning: Achieving quality for all. EFA global monitoring report*. Paris: UNESCO.
- UNESCO. (2015). *Education for all 2000-2015: Achievements and challenges. EFA global monitoring report*. Paris: UNESCO.
- United States Department of Education. (2014). *Setting the pace: Expanding opportunity for America's students under Race to the Top*. Retrieved from https://www.whitehouse.gov/sites/default/files/docs/settingthepacerttreport_3-2414_b.pdf.
- United States Department of Education. (2010). US Department of Education launches national teacher recruitment campaign. Retrieved from <http://www.ed.gov/news/press-releases/us-department-education-launches-national-teacher-recruitment-campaign>.
- Valli, L. & Buese, D. (2007). The changing roles of teachers in an era of high-stakes accountability. *American Educational Research Journal*, 44(3), 519-558.
- Villegas, A. M. & Lucas, T. (2002). Preparing culturally responsive teachers: Rethinking the curriculum. *Journal of Teacher Education*, 53(1), 20-32.
- Villegas, A. M., Strom, K. & Lucas, T. (2012). Closing the racial/ethnic gap between students of color and their teachers: An elusive goal. *Equity and Excellence in Education*, 45(2), 283-301.
- Wei, R. C., Darling-Hammond, L. & Adamson, F. (2010). *Professional development in the United States: Trends and challenges. Phase two of a three-phase study. Technical report*. Dallas: National Staff Development Council.

- Wills, J., & Sandholtz, J.H. (2009). Constrained professionalism: Dilemmas of teaching in the face of test-based accountability. *Teachers College Record*, 111(4), 1065-1114.
- World Bank (2011). *Learning for all: Investing in people's knowledge and skills to promote development. World Bank Group Education Strategy 2020*. Washington, DC: World Bank.
- World Bank. (2013). What matters most for teacher policies: A framework paper. *SABER Working Paper Series*. Washington, DC: World Bank.
- Yin, R. K. (1994). *Case study research: Design and methods*. Thousand Oaks: SAGE.
- Youngs, P. Kim, J. & Pippin, J. (2015). Teachers' responses to changes in teacher evaluation policy in Korea and the United States. In *Promoting and Sustaining a Quality Teacher Workforce*, 413-442.