

If at First, You Don't Succeed: Instructional and Institutional Responses for Students Who Fail a
High-Stakes Mathematics Exam in High School

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Abstract

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This study sought to understand the impact of high-stakes testing policy on classroom by focusing specifically on teachers. Testing policy is part of the larger context in which teachers operate and make instructional decisions. In focusing on teachers, the intent of this study was to understand the dual roles of teachers as instructors and policy enactors, and how the state's testing policy impacts the instructional decisions teachers make in their classrooms.

Two high school mathematics teachers were the focus of this qualitative study; both teachers were in the same school, which had a recent history of low pass rates on state exams. Mathematics was the focus due to the public attention that students' mathematics performance draws, and due to efforts to improve student outcomes in mathematics. As part of secondary graduation requirements, students must pass one End-of-Course (EOC) exam in mathematics (Algebra I, Geometry, Integrated Math I, and Integrated Math II are offered as options). Students' performance on the mathematics EOC exams have critical implications for their academic progression and graduation prospects, prompting attention to secondary mathematics teachers' experiences with EOC testing policy, and how the policy may influence their

instruction. One Algebra I teacher and one Geometry teacher agreed to participate in this study. Teachers were asked to discuss their experiences with EOC testing policy, as well as their school's efforts to improve students' EOC mathematics exams pass rates, particularly for students who have failed a mathematics EOC exam prior and must retake the exam.

These teachers indicated that EOC testing considerations did have a persistent influence on their instructional decisions. Their administrators encouraged focus on preparing students to pass the EOC exams, particularly students who had failed a mathematics EOC exam before. This administrative focus contributed to an instructional context in which these teachers were prompted to include EOC testing considerations in their instructional decision-making. These teachers prioritized EOC-tested learning standards in their content and pacing decisions in order to best prepare students for the EOC mathematics exams. In these ways, EOC testing considerations came to be the basis for many of these teachers' instructional decisions.

Preparing students for the EOC mathematics exams was a particularly pressing issue for retakers, students who had failed mathematics EOC exam before and needed to retake the exam. These teachers thought about how to best address the learning gaps and misunderstanding retakers brought into the classroom, with the intent to address learning issues that had prevented retakers from passing before. Additionally, attention was directed to bolstering students' academic confidence, which had often been weakened after failing a mathematics EOC exam. Both teachers made great efforts to support retakers, with the intent to bolster students' content knowledge and academic confidence to successfully pass upon retake.

As part of their instructional decision-making, teachers were asked to discuss the instructional resources that were made available to them, and which resources teachers found most supportive to their practice. Both teachers drew upon state and district learning standards

documents, particularly those that outlined which standards students would be tested on, but did not use other state or district resources. Each teacher identified teacher colleagues as their most valued and frequently utilized resource. Colleagues were instrumental in instructional decision-making, but also for understanding EOC testing policy and its implications. It is notable that there were no resources provided by the state, district, or school focused on supporting retakers, suggesting that this is an area where instructional resources could be improved.

Though both teachers accepted EOC testing as part of their instructional considerations, both teachers also raised questions about the efficacy of EOC testing as a lever for students' academic improvement, particularly for retakers. In each of their classes, these teachers noticed that EOC testing was not an effective motivator for all their students, least of all students who had academic difficulties. They also raised concerns about the constraining influence of EOC testing on their instructional decisions; with EOC testing considerations taking precedence, these teachers had to marginalize or omit concepts that were not prioritized by EOC testing. These concerns are critical to fully understanding the impact of high-stakes testing policy, and indicates areas where further research is needed. Teacher insights and experiences can contribute a great deal to understanding of high-stakes testing policy, and to analysis regarding the efficacy of high-stakes testing as a policy tool to improve students' academic performance.

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Introduction

In this study, I focused on the instructional decision-making processes of secondary mathematics teachers within a context that includes high-stakes state testing. Particular focus was directed to teachers' work with students who have previously failed one of the state's mathematics exams. These questions are being examined to study how Washington's high-stakes testing policy impacts the classroom by way of its impact on teachers' instructional decisions. Teacher responses and accounts can provide insight into the ways in which high-stakes testing affects learning processes, and provide information about the efficacy of high-stakes testing as a lever for instructional improvement. In this chapter, background information about high-stakes testing policy will be presented, examining the rationale for its use in states' K-12 public school systems. High-stakes testing for Washington secondary students will then be described, with focus on the state's use of End-of-Course (EOC) testing and its role in graduation requirements. This chapter then outlines the rationale for focusing on teachers, who operate as instructors and policy enactors, and their experiences with Washington's EOC testing policy.

The intent of this study is to contribute to the literature base on high-stakes testing and to develop further understanding of the impact high-stakes testing has on local level outcomes. In this discussion of high-stakes testing, rationales and presumptions regarding its use were examined to understand why state and education leaders support testing, and what is the intended classroom impact of this policy. This examination of high-stakes testing is done within the context of understanding best practices in mathematics instruction, and how what literature identifies as effective instructional practices coincides with the theory of action behind high-stakes testing. In analyzing impact on instruction, the focus of this study is on teachers and their practice within a context that includes institutional and policy influences.

This study further narrows its focus on students who have previously failed a high-stakes exam, as these are presumably the students that high-stakes testing seeks to address in efforts to improve academic performance. It is expected that individual students vary in their responses to high-stakes testing, but prior research focused on students' responses to failing a high-stakes exam indicates that there can be serious deleterious effects that impact students' academic identity and motivation. High-stakes testing is purported to enable schools and districts to identify students' academic deficiencies, allowing for targeted supports for students (Kearns, 2011). With this assertion in mind, this study sought to examine how teachers account for these students in their instructional decisions, and in turn, how their institution supports teachers in this endeavor. Darling-Hammond and Rustique-Forrester (2005) point out that there is potential for high-stakes testing to be an effective instructional support that encourages student success. But without consideration for students who have exhibited setbacks within a high-stakes testing system, such a system cannot effectively support all students, or their teachers' efforts.

Background

Large-scale reform in public high schools remains a persistent policy issue, one without clear answers (Noguera, 2002). Public high schools, particularly "large, factory-model high schools" (Darling-Hammond, 2006, p. 643), are tasked with increasing graduation rates and improving students' academic performance, but with little consensus on how best to do so (Darling-Hammond, 2006; Noguera, 2002). In concert with the provisions and benchmarks established by the No Child Left Behind Act of 2001, high-stakes testing continues to be employed in education policy as means to improve the academic performance of all students (Au, 2009; Darling-Hammond, 2006), including secondary students. As part of accountability systems, high-stakes testing doles out rewards and sanctions based on students' performance on state-

mandated exams (Amrein & Berliner, 2002). High-stakes testing has been a tool for states to directly measure school performance, and to distribute rewards and sanctions to schools based on students' test performance, prompting institutional focus on academic improvement (Carnoy & Loeb, 2002; Heilig & Darling-Hammond, 2008). Regardless of size, location, and composition, high-stakes testing impacts different high schools through the same mechanisms.

Guided by belief that holding schools, teachers, and students accountable for meeting established, standardized expectations will focus instructional efforts (Liang, Heckman, & Abedi, 2012), states have increased the presence of high-stakes testing within the K-12 system. By delineating the standards that students are expected to master, high-stakes testing used to affect instructional practice (Darling-Hammond & Rustique-Forrester, 2005), with the intent to create a system where students have access to the same subject matter material across various environmental contexts (Au, 2009), and address variations in access to academically challenging curriculum (Sleeter, 2005). High-stakes testing has been employed to align assessments and curriculum, providing a way to gauge the content of teachers' instruction and ensure that standards are being taught and subsequently mastered by students (Carnoy & Loeb, 2002), acting as a check to ensure students are being provided access to standards-aligned instruction. For students, the presence of high-stakes testing may also act as a motivator, encouraging students to focus behavior and attention on passing an exam (Reardon, Arshan, Atteberry, & Kurlaender, 2010). Through impact on instructional focus and practice, high-stakes testing is purported to be a lever to address disparate academic outcomes for all students (Darling-Hammond & Rustique-Forrester, 2005). High-stakes testing, used as a state tool, can be a means to improve learning outcomes for students across various schooling contexts and environments.

As part of a high-stakes testing system, standardized testing is presented as a neutral tool

to measure student performance. Jones (2014) noted that standardized testing can be viewed as an evaluation free of bias from teachers or administrators. For some parents and community members, standardized test scores are viewed as an impartial metric for gauging school quality, one that focuses on performance outcomes (Neill, 2014). As a former New York City public school teacher, Jones (2014) found that some parents believed a standardized test score would be more objective than a grade given by a potentially subjective teacher. Based on conversations with parents, Jones (2014) noted they attached a sense of “fairness” to standardized testing, as every student takes the same test, regardless of location or circumstance. Jones (2014) also discussed the benefits of having a test score be a gauge of test performance, as it presents information in terms of numbers and percentages on a scale for measure. For those concerned about the possibility of subjective assessment of students, a standardized exam can be a welcome aspect of schooling, one that measures students on a defined set of criterion. As Jones (2014) found in his teaching experience, some parents view standardized testing as an objective measure of achievement, one that minimizes possible bias and gives students a fair opportunity to excel. Testing may function as a means to communicate student learning and progress in a manner that is viewed as impartial, lacking in potential subjectivity attached to teachers and administrators.

While some literature has identified benefits in the use of high-stakes testing, other work has raised concerns over disparities in student performance, with low-income and minority students continuing to pass at lower rates than their peers, which adversely impacts their graduation prospects and retention (Amrein & Berliner, 2003; Darling-Hammond, 2010). Researchers have also found that the implementation of high-stakes testing systems does not always result increased secondary graduation rates, calling into question its efficacy in improving student outcomes (Nichols, Glass, & Berliner, 2012). In terms of high-stakes testing’s

impact on instruction, curricular and pedagogical narrowing have been observed as responses to high-stakes testing systems, with greater focus on drill and test preparation (Darling-Hammond, 2010; McNeil, 2000). Others have argued that while high-stakes testing is meant to ensure that all students are held to the same rigorous standards, this perspective does not account for or address inequalities in school capacity and instructional resources (Diamond, 2007). The implementation of a high-stakes testing system alone is not a guarantor of improvement in instruction or student outcomes. For high-stakes testing systems to have a positive impact on student learning outcomes, attention to instructional facets must also be present in reform efforts (Darling-Hammond & Rustique-Forrester, 2005).

In examining testing and its impact on student learning outcomes, the role of teachers necessitates consideration. Teachers operate not only as instructors but also as policy mediators and local-level enactors (Cohen & Hill, 2001; Cohen, Moffit, & Goldin, 2007), highlighting the multiple responsibilities and demands that are placed on teachers (Everitt, 2012). In interpreting and responding to high-stakes testing policy, teachers' content and task decisions (Darling-Hammond & Rustique-Forrester, 2005), as well as lesson planning (Amador & Lamberg, 2013), can be affected. The influence of high-stakes testing may impact teachers at multiple levels, both directly and through their institution (Amador & Lamberg, 2013), influencing the context in which instructional practice occurs (Cobb, McClain, de Silva Lamberg, & Dean, 2003). However, prior researchers have found that the influence of high-stakes testing policy varies across different school and classroom contexts (Coburn, 2004; Diamond, 2007), necessitating further examination of teachers in different contexts to see what themes and patterns may arise. Responses from teachers in schools with low test scores and the looming threat of sanctions are likely to be vastly different than responses from their counterparts in high-scoring schools. To

full understand the impact of high-stakes testing policy at the classroom level, the various experiences of teachers must be illuminated, as they are tasked with interpreting and integrating this policy into their instructional practice and decision-making.

Within the public K-12 school system context, teachers and their schools are also tasked with being responsive to state education decisions, even those that may be implemented simultaneously or changed unexpectedly. During the 2014-15 academic year, Washington was in the midst of a period of multiple changes to state learning standards, assessment format, and secondary graduation requirements. Further contributing to these changes was the introduction of Common Core State Standards (CCSS) and the Smarter Balanced assessment across the state's K-12 public schools¹. As a result, this created a context in which teachers were tasked with addressing high-stakes testing policy and upcoming changes to state standards within their practice, even though CCSS is not designed to align perfectly with existing Washington learning standards. As part of understanding how teachers respond to high-stakes testing policy, there must be consideration of their practice within a context that includes the introduction of another major education policy, one that directly impacts what their students are to learn. In examining how teachers interpret and respond to high-stakes testing policy, it is necessary to look at how testing policy fits into the larger sociopolitical context (Cobb et al., 2003) that teachers' practice occurs within. This study aims to understand the experiences and perspectives of secondary mathematics teachers, who were in a high school with a history of below average test scores, within a context that included simultaneous policy initiatives occurring.

End-of-course (EOC) testing has increasingly become part of states' high-stakes testing systems (Zabala, Minnici, McMurrer, & Briggs, 2008). Rather than assess students on material

¹ These changes will be discussed in further detail in subsequent chapters.

from a variety of courses, EOC exams focus on individual courses and are administered after students have completed the course, which is designed to strengthen the relationship between course and tested material (Zabala et al., 2008). Washington is one state that has adopted EOC testing as part of efforts to improve students' academic outcomes. In order to graduate from a Washington public high school, students must now successfully pass EOC exams in mathematics and biology, in addition to High School Proficiency Exams (HSPE) in reading and writing (Washington Office of Superintendent of Public Instruction, 2014a)². For the mathematics portion, students are currently required to pass one EOC exam, either in Algebra I, Geometry, or the Integrated Math sequence (Washington Office of Superintendent of Public Instruction, 2014a). Consistent with Darling-Hammond and Rustique-Forrester's analysis (2005), EOC testing is employed as a state tool to ensure that courses are taught according to the same standards and instill consistency across schools in varied contexts.

Considering the influence high-stakes testing can exert over the core processes of instruction, including teachers' practice (Darling-Hammond & Rustique-Forrester, 2005), it is necessary to examine the impact of EOC testing in Washington as a form of high-stakes testing, looking at the implications these exams have for teachers and their instruction. While the format of Washington's high-stakes exams have shifted over the last decade (Washington Office of Superintendent of Public Instruction, 2014a), the mechanisms through which they are applied are largely the same. Even with the state's impending shift to Common Core State Standards (CCSS) and the Smarter Balanced assessments (in both English language arts and mathematics) in the 2014-15 academic year, successful completion of EOC exams will remain a high school

² Washington State offers alternative options for meeting graduation requirements, but students must attempt an exit exam at least once before pursuing an alternative option (Washington State OSPI, 2014b). Students may submit a Collection of Evidence portfolio, pursue a GPA comparison, or submit college admission/AP/IB test scores to meet graduation requirements. Students receiving Special Education services have alternative options to meet graduation requirements, based on their Individualized Education Programs.

graduation requirement until this transition (Washington State Office of Superintendent of Public Instruction, 2014a). However, shifts in exam type do not negate larger concerns about the use of high-stakes testing as part of education policy, and how core facets of teachers' instructional decision-making might be impacted by such policy changes.

Focus on instruction may be most pressing for students who have previously failed a standardized exam and must retake the exam as a result. Students who have failed a high-stakes exam already may have developed doubts regarding their academic abilities (Catterall, 1989). These students may also be at greater risk for dropping out of school in response to prior failure (Amrein & Berliner, 2003; Roderick & Nagaoka, 2005). In order to successfully pass high-stakes exams and address prior academic difficulties, students who have previously failed need teachers who can be responsive to their particular learning needs (Darling-Hammond & Rustique-Forrester, 2005). This is particularly pressing for secondary students, who need support to pass exams that impact their graduation prospects. Instruction for these students likely must include different pedagogical approaches, while also addressing students' concerns about and confidence in their academic abilities. The question then becomes what changes do occur in instructional practice in response to students who have failed a high-stakes exam, if any, and how teachers might be supported or constrained in the process of instructing and supporting these students.

High-stakes testing is framed as a policy lever to improve learning outcomes for all students (Au, 2009). Additionally, high-stakes tests have been purported as a means to increase student motivation, including for students presumed to be apathetic and detached from schooling (Amrein & Berliner, 2003). In practice, the outcomes of high-stakes testing continue to raise concerns about disparate learning impact and outcomes. There are also questions about the capacity and efficacy of institutions and its actors to respond to students who do not pass. In

order to support all students to master subject material and successfully pass high-stakes exams, there must be accompanying efforts to address all students' learning needs (Amrein & Berliner, 2003; Darling-Hammond & Rustique-Forrester, 2005). Broader understanding of teachers' instructional decision-making and enactment, within the context of their institutions, is needed to support understanding of how student learning opportunities might be impacted.

Study Overview

Drawing from literature focused on high-stakes testing and students who have failed high-stakes exams, this study examined teachers' instructional decision-making for students who must retake a high-stakes test and the factors that contribute to teachers' understanding of and response to state testing policy. Analysis focused on individual teachers and the particular ways in which teachers formulate and enact their understanding of state testing policy in the classroom, with particular attention to instructional responses and how teachers respond to students who have previously failed a state high-stakes mathematics exam, impacting student learning opportunities. As part of analyzing institutional responses, the role of resources and professional learning was studied as a way to understand what supports are provided to teachers in their understanding and enactment of testing policy. This study is grounded within the context of teachers' work within the institution, examining how the institution might impact their instructional decision-making, and the effect of institutional resources on instructional decisions.

This study focused specifically on secondary mathematics teachers and their experiences with Washington's EOC exams in Algebra I and Geometry. While students do have the option to take the Integrated Math sequence to complete the EOC requirement, data from the Washington Office of Superintendent of Public Instruction (OSPI) indicates that the majority of Washington public high school students elect to take the Algebra I and Geometry EOC exams (In 2013,

106,378 students completed the Algebra I EOC and 68,056 completed the Geometry EOC, compared to 3,042 and 2,434 students who completed the Integrated Math 1 and 2 exams, respectively). Washington student data indicates that few students opt to take the Integrated Math sequence, enrolling in the traditional Algebra I/Geometry sequence instead (J. Judkins, personal communication, October 17, 2014), prompting focus on those courses and their EOC exams. Additionally, there is particular interest in Algebra I because of its role as a curricular gatekeeper (Liang et al., 2012); without successfully passing the Algebra I EOC, students' progression into higher mathematics courses is halted. As a result, it is critical to understand how teachers instructionally support students to subsequently pass the Algebra I and Geometry EOC exams, particularly after some students experience initial exam failure.

For the 2012-13 academic year, 53% and 76.7% of all Washington students who took the Algebra I and Geometry EOC exams met standard and passed, respectively. A considerable number of students were then required to retake these exams in 2013-14 academic year in order to meet state high school graduation requirements. Additionally concerning is the disaggregation of pass rates by grade level, which will be discussed later in the paper. Students attempting EOC exams in the secondary grades are also exhibiting lower pass rates compared to students taking these courses and exams at the middle school level. With the implications of EOC exam performance on students' high school graduation prospects, it is of considerable concern that high school students are demonstrating greater difficulty successfully passing EOC mathematics exams. This necessitates greater understanding of how secondary mathematics teachers are responding, how this may impact their instructional decision-making processes, and what responses schools are formulating to support EOC retakers in particular.

Despite prior research highlighting persistent gaps in students' test performance and

concerns from school actors, high-stakes testing systems continue to be a prominent component of state education governance. Questions regarding the efficacy of high-stakes testing necessitate investigation. From a state governance perspective, high-stakes testing represents a considerable financial commitment to purchase and score exams (Au, 2009); from a financial standpoint, it is critical to determine if a high-stakes testing approach is an effective use of state funds to increase student learning outcomes. Smith and Larimer (2009) also note there is often a gap between intended policy impact and what actually occurs in practice. While Washington State OSPI asserts that the purpose of state testing is to ensure all students have access to a “quality education” (2014a), it remains to be seen whether or not high-stakes testing has effectively ensured this is the case within all Washington State schools. Additionally, this testing policy is in place while there are other major changes being implemented across the Washington State K-12 system, necessitating examination of how these different initiatives may or may not coincide, and how these multiple initiatives might impact teachers’ practice.

This study examined the following questions:

1. What are the different considerations of the instructional decision-making process for Algebra I/Geometry teachers with students who must retake the EOC exam?
2. What impact might teachers’ individual zones of enactment have on instructional decision-making for students retaking the Algebra I/Geometry EOC exam? How might the zone of enactment mediate teachers’ responses to EOC testing?
3. What resources are provided by the state, district, and school to address teachers’ understanding of EOC testing policy? How do these resources contribute to teachers’ instructional decision-making for students who must retake the Algebra I/Geometry EOC exam?

4. What implications do state policy context and simultaneous initiatives have for teachers and their instructional decision-making?

Literature Review

As an education policy tool, high-stakes testing has both staunch supporters and detractors, with research and literature supporting both perspectives. Supporters assert that high-stakes testing acts as a motivator for students, teachers, and parents, encouraging these actors to focus efforts on improving academic performance. In their analysis of state accountability systems and students' National Assessment of Educational Progress (NAEP) mathematics exam performance, Carnoy and Loeb (2002) found a positive relationship between state use of high-stakes testing and students' mathematics achievement. However, the efficacy of high-stakes testing has been challenged by other research indicating that positive effects are not apparent for all students, as minority and low-income students have been observed failing high-stakes exams at disproportionately high levels (Darling-Hammond, 2010). Other literature, which will be discussed further below, decries the curricular narrowing that is occurring in classrooms as a result of focus on test preparation. These different literature bases indicate the varied impact high-stakes testing systems are having across different school contexts. To develop a stronger sense of the efficacy of high-stakes testing, and how high-stakes testing operates in practice, further research of testing's impact at the classroom level is needed. In doing so, an understanding of how high-stakes testing affects the learning processes occurring in the classroom can be further developed, providing insight into impact on teachers and students.

High-Stakes Testing in State Education Policy

The theory behind the utilization of high-stakes testing presumes that the pressures associated with test performance spurs improvement in student achievement (Heilig & Darling-Hammond, 2008; Nichols et al., 2012). Underpinning the use of high-stakes testing is belief that student test performance is a reasonable measure of educational output (Koretz, 2002). High-

stakes testing allocates rewards and sanctions based on test performance, which in turn impacts the decisions and behavior of student and school personnel alike (Diamond, 2007). Test results may serve as the basis for decisions about student retention or promotion (Darling-Hammond, 2004), enabling test results to be used as a lever to modify behavior and prompt teachers and students to “work harder, better, and learn more” (Nichols et al., 2012, p. 3). The underlying belief of high-stakes testing is that holding all students accountable to the same test instills the same high expectations for all (Diamond, 2007; Knecht, 2007; Ullucci & Spencer, 2007). High-stakes testing intends to provide all students access to learning opportunities that were previously available only to middle- and upper-class students (Diamond, 2012).

Accountability

Accountability is readily apparent in prior research discussing high-stakes testing and its application. By holding students and teachers responsible for the outcomes on high-stakes exams, the assumption is that this accountability holds these parties responsible for the learning process (Roderick & Nagaoka, 2005; Ullucci & Spencer, 2009). The pressure of accountability stems from the market perspective, in which accountability is a lever to induce behavioral changes from the input to obtain a desired output (Au, 2009; Ullucci & Spencer, 2009). High-stakes testing has also instilled accountability on the part of schools, as testing has increased attention to gaps in performance and outcomes, necessitating schools direct efforts and resources to closing these gaps (Darling-Hammond & Rustique-Forrester, 2005; Knecht, 2007). In instilling accountability on the part of students, teachers, and schools through the dispersal of rewards and sanctions, high-stakes testing renders these parties publically responsible for performance, by which attention and behavior can be directed.

Efficiency

High-stakes testing represents an efficient policy tool, as the testing process reveals what students have and have not mastered according to established standards (Mitchell & Encarnation, 1984). As a result, high-stakes testing is an attractive policy tool, as it can be implemented with a standardized measure for all students across a variety of learning contexts. Like standards-based reform, high-stakes testing may be an appealing policy tool because it can be implemented within the current system of education without making fundamental changes (Laitsch, 2002). As a policy, high-stakes testing intends to build public confidence in the education system on the basis of improved student performance (Heilig & Darling-Hammond, 2008). With its use, it is governmental agents who are the primary beneficiaries of testing policy, as improvements are credited to the system, but failures are placed on schools (Heilig & Darling-Hammond, 2008). As a policy, high-stakes testing is an efficient option for the state, as it operates as a tool to gauge student learning for accountability purposes, but also establishes clear and lofty expectations without designating how students and teachers are to reach them.

Relationship Between Policy and Schooling

Additionally, high-stakes testing operates to tighten the relationship between the policy and schooling spheres. Historically, the policy and schooling spheres have been “loosely coupled,” allowing schools to operate with only ceremonial compliance to policy edicts (Cohen & Hill, 2001; Diamond, 2007). High-stakes testing is a reversal of the policy sphere’s typical stance of being largely removed from the school environment (Smith & Larimer, 2009), as it “recouples” policy and school and enables those in the policy sphere to exert considerable influence over school behaviors (Hallett, 2010). Schools are unable to continue their practices unabated, as the sanctions and rewards attached to test performance prompt schools to ensure their efforts and resources are directed to meeting mandated outcomes (Hallett, 2010). High-

stakes testing policy is not only efficient, but it enables greater oversight on the part of the policy sphere over what is taught by delineating standards for mastery (Dingman, 2010). Considering the benefits on the part of the policy sphere, the expectation is that states will continue to incorporate high-stakes testing as part of education policy efforts (Dietz, 2010), despite concerns about potentially deleterious effects at the school level. High-stakes testing continues to receive solid support from politicians and members of the business community, who view testing as a tool to standardize education and its student outputs (Au, 2009), thus ensuring that students are taught according to the same concepts. Use of high-stakes testing continues to operate as a policy tool to allow tighter control over the learning standards that often guide classroom instruction.

Impact of High-Stakes Testing on the Institution

By holding all schools accountable to specified high standards, the presumption is that all schools will direct their efforts and resources to ensuring every student can meet these metrics. Through testing, the expectation is that schools will increase attention to student learning needs, focus on standards, and provide professional learning to teachers (Darling-Hammond & Rustique-Forrester, 2005). However, this theory of action does not account for the differential capacity that exists within each school (Carnoy & Loeb, 2002; Heilig & Darling-Hammond, 2008). Roderick and Engel (2001) question how schools develop or maintain an environment that supports students and teachers in providing high-quality learning opportunities, which affects how schools respond to high-stakes testing policy. In one study (Johnstone, Dikkers, & Luedeke, 2009), superintendents were asked to discuss their work within a schooling context focused on students' high-stakes test performance. Respondents expressed that responding to high-stakes testing edicts requires funding, funding that is not always readily available to schools, impacting their response capacity (Johnstone et al., 2009). Respondents in the Johnstone et al.

(2009) study also expressed the difficulty of meeting the learning needs of diverse student populations with limited funding, which impacts the learning opportunities afforded to students with different needs. Issues regarding per-pupil funding must be addressed as part of education reform efforts (Ullucci & Spencer, 2009), which suggests that there are other factors that necessitate attention in the schooling sphere. In examining how institutions are impacted by high-stakes testing, and how they subsequently formulate and enact responses, attention must be directed to the issue of school capacity, which determines how much support students and teachers receive (Heilig & Darling-Hammond, 2008).

The potential rewards and sanctions attached to student performance high-stakes exams ultimately impacts school leaders and their actions (Heilig & Darling-Hammond, 2008), as it can attach labels to schools, leaders, teachers, and students. Low pass rates and scores may instill negative public perceptions about a school, prompting schools to focus efforts and resources on improving test performance (Perna & Thomas, 2009). With test results increasingly being used as a measure of student performance, these results shape how school leaders characterize and enact effective practices (Haynes, 2008). In response to high-stakes testing pressures, school leaders may encourage or stipulate that teachers devote more instructional time to tested subjects over non-tested material (Amrein-Beardsley, Berliner, & Rideau, 2010; Diamond, 2007). In some instances, it appears that school leaders have approached instruction and resources from the perspective of improving test scores, rather than focusing on student learning and mastery. Ironically, increased institutional focus on high-stakes testing may be not be an effective approach, considering DeMoss's (2002) study of eight Chicago schools and their leadership approaches, which found that one K-8 school's strong performance on high-stakes testing was the result of high-quality instruction, not of singular focus on test preparation. However, schools

under pressure to improve test scores appear to have an institutional focus on test preparation, which may provide more rapid short-term improvement, than long-term on bolstering instructional practice, which can ultimately improve test scores by encouraging growth in student learning (Darling-Hammond, 2010; McNeil, 2000). The intent of high-stakes testing as a policy is to influence school-level behaviors, but it must be assessed whether this influence encourages schools to invest in high-quality instruction, or prompts schools to narrow focus onto testing.

Concern about schools “gaming the system” has also been raised in prior research (Amrein & Berliner, 2002; Heilig & Darling-Hammond, 2008; Perna & Thomas, 2009). In an attempt to improve test performance, schools may focus resources and supports on students who are close to the passing threshold in order to spur students to consequently pass (Perna & Thomas, 2009). As a result, students who exhibit the greatest struggles are at risk of being marginalized by schools. School leaders have been charged with suspending or encouraging low-performing students to miss testing days to ensure their scores do not factor into classroom, school, or district composite scores (Amrein-Beardsley et al., 2010). School leaders may also manipulate student enrollment to improve overall student performance, either by retaining students to allow more test preparation time, or to ensure students avoid tests administered in certain grade levels (Amrein & Berliner, 2002). In their analysis of students in Texas, Amrein & Berliner (2002) found low-income and racial minority students were being retained in the ninth grade in increasing numbers, particularly as compared to their White peers, in an attempt to prevent these students from taking the Texas Assessment of Academic Skills (TAAS) exam administered in tenth grade. In some instances, schools have resorted to reclassifying students as learning disabled or Limited English Proficiency (LEP), even in mild cases, in an attempt to secure testing exemptions and remove presumed low-scoring students from overall school results

(Amrein & Berliner, 2002). Consequentially, in schools where these actions are occurring, the focus is not improving student access to high-quality learning opportunities, as is purported to be a benefit of high-stakes testing. Testing has the potential to be a lever for improved learning outcomes, but there must be attention to creating better learning opportunities, as opposed to figuring out how to modify the tested population (Darling-Hammond & Rustique-Forrester, 2005). Otherwise, concerns about schools “gaming the system” and manipulating student enrollment in response to high-stakes testing systems will continue to proliferate.

By devoting resources and attention to high-stakes exam performance, schools may divert focus from other school functions, such as social development. In response to overt focus on high-stakes testing outcomes, Musoleno and White (2010) cautioned against middle schools moving away from institutional focus on adolescent development and support towards test preparation practices. Academic performance is only one aspect of student development that schools are now expected to address, and an overt focus on testing may detract resources and attention from other critical functions that schools provide. Based on their study of 15 high schools in states with varying approaches to exit exam policies (California, Florida, Georgia, Maryland, and Pennsylvania), Perna and Thomas (2009) expressed particular concern for schools with low-performing student populations, as these schools tended to “divert systematic attention away from activities that promote college enrollment in order to concentrate on skills associated with state-mandated tests” (p. 452). In these schools, focus on high-stakes testing also impacted the counseling services provided, as counselors opted to prioritize test performance to meet graduation requirements, rather than on discussing college preparation with their students (Perna & Thomas, 2009). As some schools intensify focus on students’ test performance, there must also be examination of how the institution as a whole is impacted, and whether or not the other

core schooling functions might be adversely impacted as a result.

Impact of High-Stakes Testing at the Classroom Level

Though standardized testing aims to impact students in a uniform manner, the classroom-level outcomes of testing have been wildly divergent. Some researchers have found that the inclusion of high-stakes testing has: increased schools' emphasis on academics (Perna & Thomas, 2009); instilled a focus on high-quality content for all students (Diamond, 2007); resulted in student learning gains (Carnoy & Loeb, 2002; Winters, Trivitt, & Greene, 2009); and imparted test-taking skills for college admissions exams (Perna & Thomas, 2009). Conversely, other research has outlined adverse ways high-stakes testing has impacted the classroom. In particular, concerns have been raised over increased student dropout rates (Amrein & Berliner, 2002) and decreased graduation rates (Amrein & Berliner, 2002; Heilig & Darling-Hammond, 2008). Research has also identified disproportionately negative outcomes for low-income and minority students (Darling-Hammond, 2010; Dietz, 2010; Perna & Thomas, 2009), students with disabilities (Thurlow & Johnson, 2000), and English language learner (ELL) students (Giambo, 2010). These students tend to score lower than their peers and have a lower pass rate. Though high-stakes testing is purported to equalize opportunities, testing policies have not been uniformly applied across the country, with more punitive policies enacted in states with higher numbers of minority and low-income students (Nichols et al., 2012; Perna & Thomas, 2009). As a result, the impact of high-stakes testing has varied across different schools. With increased focus on test performance and the threat of sanctions for unsatisfactory outcomes, struggling schools may direct attention and resources to improving test performance (Perna & Thomas, 2009), potentially marginalizing students with the greatest learning needs (Kearns, 2011). Additionally, Darling-Hammond (2010) cautions that gains in tests scores may not be indicative

of student learning, necessitating understanding of whether test scores are the product of subject understanding and mastery or of test preparation. Though high-stakes testing may focus and guide instructional efforts towards increasing student achievement, additional scrutiny is needed to understand its impact on instruction and learning outcomes across various schooling contexts.

Much as schools respond to high-stakes testing in varied ways, students also have differing responses. Students develop conceptions of their abilities and learning identity, and increasingly are connecting self-perceptions of competence to test performance (Dutro & Selland, 2012). As a result, some students experience mismatches between self-perception and test-taking ability (Kearns, 2011), or view high test performance as an unattainable goal (Roderick & Engel, 2001). Students who are already labeled low-achieving may respond with increased effort and motivation (Roderick & Engel, 2001), or may be increasingly discouraged by the presence of high-stakes testing (Dutro & Selland, 2012; Reardon et al., 2010). Some students may also experience heightened cognitive and physiological symptoms as a result of test anxiety, specific to the increased stakes attached to test results (Segool, Carlson, Goforth, von der Embse, & Barterian, 2013). While high-stakes testing is presumed to have a standard impact on students, research demonstrates that students' responses to testing vary wildly, suggesting that high-stakes testing cannot be presumed to impact students in a uniformly positive manner.

Though high-stakes testing is presumed to motivate students to work harder in the classroom, some raise caution that it may actually have an adverse effect on student motivation and reduce intrinsic interest in learning (Amrein & Berliner, 2003; Thompson & Allen, 2012; Ullucci & Spencer, 2009). Increased focus on testing may be a potential cause of increased student apathy, as content and subjects may be pushed out of the classroom in favor of test preparation (Mora, 2011; Thompson & Allen, 2012). Mora (2011) asserted that the

individualistic structure of test preparation fails to engage students, particularly when test preparation pushes out student-centered instruction that encourages activity and collaboration. Heightened focus on test preparation may also discourage teacher efforts to connect to students' background knowledge and interests as a way to increase intrinsic interest in content. Haynes' (2008) study of elementary school teachers in Texas found incompatibilities between test preparation and student-centered instruction; teachers sought to incorporate students' cultures into instruction to encourage student interest, but these efforts were discouraged by administrative focus on test preparation. As a result, teachers became concerned about how they were connecting to their students and encouraging their engagement in content (Haynes, 2008). An increased focus on test preparation may improve scores, but it may come at the expense of disengagement for some students, which may discourage improvement in learning outcomes.

In the classroom, the presence of high-stakes testing impacts the learning opportunities afforded to students, with prior research finding greater emphasis and classroom time spent on tested subjects, with non-tested subjects being marginalized as a result (Darling-Hammond, 2010; McNeil, 2000; Ullucci & Spencer, 2009). With high-stakes testing focusing primarily on student performance in mathematics and language arts, instruction in less tested subjects (e.g. science, social science, foreign language, art, music, and physical education) has been noticeably reduced (Au, 2009). As a result, students' learning opportunities are noticeably constrained (McNeil, 2000), which can preclude the inclusion of more challenging or engaging subject matter into the classroom (Au, 2009). Dingman (2010) also pointed out that with increased focus on high-stakes testing outcomes, tested content standards have taken on precedence in the classroom, which may ensure students have access to standards-based instruction, but can also limit learning to only what is covered in the standards. Schools seeking to increase test scores

may also focus on test preparation in lieu of content, reducing instructional quality and quantity (McNeil, 2000). By prioritizing standards for testing, states are delineating important concepts for mastery, but may also simultaneously constrain students' learning opportunities as schools focus on preparing students to pass high-stakes exams.

Though high-stakes testing is purported to focus resources and efforts on increasing student achievement, it does not address other classroom-level factors that influence learning outcomes. The manner in which high-stakes testing operates does not necessarily positively impact the distribution of quality, nor does it necessarily change pedagogical practices (Diamond 2007; 2012). Lankford, Loeb, and Wyckoff (2002) found that New York City schools with high populations of low-income, minority, and low performing students were staffed by less qualified teachers, which necessitates attention as issues concerning quality teacher distribution and retention are not directly addressed by high-stakes testing policy. High-stakes testing can exacerbate teacher staffing issues, as teachers may leave schools identified as "low-performing" based on test results (Assaf, 2008) or purposefully seek schools with stable, high test scores (Darling-Hammond, 2004), further disproportionately harming schools and students that have greater need for quality teachers. Without attention to the distribution of high-quality teachers, high-stakes testing as a reform is unlikely to achieve unilateral high student achievement, as teachers with quality pedagogical practices are necessary for improvement in students' learning outcomes (Darling-Hammond & Rustique-Forrester, 2005). High-stakes testing itself is not sufficient to address other factors that influence instructional quality and learning opportunities.

In particular, high-stakes testing does not operate to ensure that all students have access to quality instructional practice. Diamond (2012) noted disparities in students' access to interactive or authentic pedagogy, which is associated with higher order thinking, problem

solving, and complex communication, skills that are emphasized for educational and vocational access. Interactive forms of instruction are also correlated with improved student outcomes (Diamond, 2012), underscoring the need for all students to have access to such pedagogy. However, affluent students are more likely to receive interactive or authentic instruction, while working-class students are more likely to receive conventional or didactic instruction that is teacher-centered and focuses on memorization, recitation, lecture, and seat work (Diamond, 2012). These disparities may be exacerbated by high-stakes testing, as the memorization and recitation emphasized in didactic instruction is often employed to prepare students for testing, at the expense of pedagogy that encourages critical thinking (Darling-Hammond & Rustique-Forrester, 2005). The scope of concepts that must be covered may also encourage the use of didactic pedagogy, which enables teachers to cover all these topics, but not in an authentic manner (Crocco & Costigan, 2007). Through study of an elementary school reading specialist in Texas, Assaf (2008) describes the tensions of feeling pulled between utilizing authentic instructional practices and responding to accountability pressures. Pedagogical narrowing has been observed more often in schools with low test scores (Darling-Hammond, 2010; McNeil, 2000), which does not support the presumption that high-stakes testing ensures quality content for all students. Without addressing student access to high-quality instruction, high-stakes testing alone does not assure that improved student learning outcomes will occur, necessitating greater focus on issues of pedagogy and content within testing systems.

To develop a clearer understanding of the classroom-level impact of high-stakes testing, closer examination of teachers' responses to accountability policy is necessary (Palmer & Rangel, 2011). High-stakes testing has become an ever-present feature of the institutional context in which teachers operate (Amador & Lamberg, 2013; Everitt, 2012), contributing to the multiple

demands teachers must meet in their practice (Bidwell, 2001). Diamond (2007; 2012) notes that the presence of high-stakes testing influences instructional practice in varied ways, contingent on other personal and institutional factors that impact pedagogy. Still, while pedagogical practices may be less impacted by the inclusion of high-stakes testing, teachers in Diamond's (2007; 2012) research did report the tested standards influenced lesson content, consistent with what Amador and Lamberg (2013) found in their study. High-stakes testing appears to contribute to the differing demands of the institutional context, though Everitt (2012) questions whether testing enables or constrains teachers in their instructional practice. Considering teachers' roles as instructors, policy mediators, and policy enactors (Cohen & Hill, 2001), understanding teachers' experiences within high-stakes testing systems is critical to understanding of the classroom-level impact of testing. As teachers are simultaneously responsible for ensuring quality learning experiences and preparation for testing (Palmer & Rangel, 2011), greater understanding of their experiences provides insight into the manner by which high-stakes testing impacts the context in which teachers operate, and how teachers' responses structure students' classroom learning.

Issues of high-stakes testing acting as a constraint on teacher practice are concerning in relation to teachers' perceptions of their positions. In response to Regents testing in New York City, some teachers expressed that their autonomy and professional status were weakened as a result of overemphasis on students' test performance, which led to feelings of deprofessionalization and depersonalization (Crocco & Costigan, 2007). Feelings of deprofessionalization may be heightened in teachers who feel high-stakes testing has been imposed upon the schooling system by external actors, rather than through input from teachers and school actors (Kubow & DeBard, 2000). Sleeter and Stillman (2007) also found teachers in California frustrated at what they perceived to be a loss of autonomy in their classroom, as

factors outside the classroom had come to strongly influence their pedagogical choices and decisions. Additionally, there are concerns with the movement to incorporate students' high-stakes test scores into teacher evaluations, considering issues with testing validity and how representative test performance is of teacher efficacy (Koretz, 2002). In a survey, teachers in one Ohio district asserted that such metrics are not a reliable way to evaluate teacher performance (Kubow & DeBard, 2000), echoing concerns raised by Jones and Egley (2004) and Zimmerman and Dibenedetto (2008) about the use of test scores as part of teacher evaluation. Across different studies of teachers and their responses to high-stakes testing, a number of concerns related to teacher practice have been identified, necessitating attention to how these issues may bear on teachers' sense of professional autonomy and perceptions of the profession.

In gauging the efficacy and outcomes of high-stakes testing in improving student learning, collecting teacher perceptions and reactions are necessary to identify effective and ineffectual aspects (Jones & Egley, 2004; Kubow & DeBard, 2000). Adverse teacher reactions to high-stakes testing may be a product of contradictions in high-stakes testing, as accountability in this form presumes that teachers are not doing a good job, but it is teachers who are expected to bear the brunt of improvement (Palmer & Rangel, 2011). From a survey of primary school teachers across Florida, Jones and Egley (2004) found some teachers decried an accountability system that was created by policymakers without input from educators. In their responses, some teachers expressed skepticism with high-stakes testing as a reform, particularly in terms of testing being used as a political tool rather than as a learning tool (Jones & Egley, 2004). In the Jones and Egley (2004) study, one theme that emerged from teacher responses was a call for an accountability system that is developed in conjunction with educators, rather than one that is forced on the school system. In rethinking accountability in the form of high-stakes testing, a

system can be developed that works in concert with school actors, as well as making teachers a partner in the process and supporting the development of high-quality teachers. Further studies can support identification of accountability system aspects that support student learning and growth, done in ways that are supported by local-level school actors.

Similar to the variations in institutions' responses to high-stakes testing policy, teachers also have dissimilar responses, which may be affected by personal and contextual factors. Spillane's (1999) work highlights multiple factors that affect teachers' responses to reform efforts. In what Spillane (1999) terms the "zone of enactment," teachers' capacity, will, learning opportunities, and prior practice interact and guide the individual responses teachers have to reforms³. Though the use of high-stakes testing policy assumes similar responses and behavioral changes from affected parties (Au, 2009), this perspective negates the individual perspectives and experiences teachers bring with them into their work (Cohen & Hill, 2001; Spillane, 1999). In developing understanding of how high-stakes testing impacts the classroom, focus must be directed to teachers' individual experiences, and the ways in which external policies interact with the multiple elements of instructional practice. As the level of influence varies across different school and classroom contexts (Coburn, 2004), examining how external sociopolitical factors (Cobb et al., 2003) interact with teachers' individual beliefs, perspectives, and experiences would support understanding of the impact of high-stakes testing policy at the classroom level.

Failing a High-Stakes Exam

Failure is a pressing concern in schools regardless, but failure on a high-stakes exam has increased consequences for student promotion, placement, and retention, rendering failure on these exams highly consequential to student progress. As a result of failing a high-stakes exam,

³ The zone of enactment will be further discussed in the Conceptual Framework chapter

students may experience shock, stress, and shame (Kearns, 2011). In their study of juniors and seniors who had failed the North Carolina Minimum Competency Test (MCT), Richman, Brown, and Clark (1987) reported that these students exhibited “a marked increase in neuroticism and apprehension with a corresponding decrease in general self-esteem” (p. 14). Responses to failure may be tempered by student confidence and motivation to persist and pass on subsequent attempts (Catterall, 1989; Roderick & Engel, 2001). Richman et al. (1987) note the heightened consequences of failing a high-stakes exam for students’ future prospects, and how these pressures adversely impacted students’ sense of academic self-efficacy. Stronger understanding of student high-stakes exam failure is necessary to understand the ways in which students are impacted, and what responses might be most supportive for students.

Failing a high-stakes exam can also have adverse impact on students’ academic sense of self. Students who have failed a high-stakes exam may develop doubts about their academic abilities (Kearns, 2011) and their graduation prospects (Catterall, 1989), which impact learning progress and trajectories. Some may also disengage themselves from academics in order to maintain their self-esteem and mitigate subsequent repeated testing (Roderick & Nagaoka, 2005). While the impact of failing a high-stakes exam affects students differently, more adverse outcomes have been observed for low-income and minority students (Reardon et al., 2010), contributing to concerns about disproportionate effects and outcomes, and how failing an exam may affect students’ progression and prospects. Concerns about high-stakes testing adversely impacting student motivation (Amrein & Berliner, 2003; Kearns, 2011) are particularly heightened for students who experience failure, as these students often need targeted supports for their learning (Roderick & Nagaoka, 2005). What these learning needs are, and how teachers and schools respond to these needs, requires further study to support students’ academic sense of self.

There is no consensus about how student high-stakes exam failure is best addressed, potentially due to lack of understanding about what practices might be most effective. Anagnostopoulos (2003) notes a gap in understanding how institutions and teachers address student failure within the accountability system of high-stakes testing. From case studies of secondary English teachers in Chicago, Anagnostopoulos (2003) found most of these teachers reinforced their normal practices rather than shift or adopt new ones to respond to student failure, counter to the changes expected in high-stakes accountability systems. In response to pressure to increase student pass rates on standardized exams, some teachers targeted instructional resources specifically to raising test scores, despite decrying the loss of classroom time to testing (Anagnostopoulos, 2003). The increase in “teaching to the test” and lack of change in pedagogical practice may be attributed to cognitive shields that enable teachers to distance themselves from student failure (Anagnostopoulos, 2003). Administrators and educators may reason that test failure is the product of individual student efforts, not of school or educator action (Catterall, 1989). In response to accountability pressures and some teachers’ static instructional response, Anagnostopoulos (2003) asserts the need for professional learning and supports for teachers to assess the learning needs of students who have failed, and how teachers might alter their instructional practice to meet these learning needs. Institutional and teacher responses to student failure must go further than simply stemming the rate of failure and address students’ learning needs that encourage and contribute to student success.

Student responses to high-stakes test failure are seemingly heightened by the severe consequences attached to performance. Those who are retained as a result of failing a high-stakes exam must also subsequently improve enough to mitigate initial failure, which raises the question of how teachers respond to students who must improve rapidly (Roderick & Nagaoka,

2005). These issues are compounded by differential ability, as it is students who are at greatest risk for failure who may be least able to respond to testing (Roderick & Engel, 2001). The effects of retention based on high-stakes test performance are significantly more negative for older students (Roderick & Nagaoka, 2005), which may be the product of having less time for improvement, or may be the result of detachment. Additionally, Reardon et al. (2010) note that students who do not pass state exit exams may be the ones who were already at risk of failing to graduate; for these students, a high-stakes exam may not be sufficient in supporting or encouraging students to improve or invest in learning. Institutional response for retained students who must retake high-stakes exams may need to be vastly different and consider the underlying reasons for why students do not pass, and why testing may not be an academic motivator.

The issue of retention and retaking exams may be an even more pressing issue for Algebra I students, considering efforts to broaden access to the course and improve student learning outcomes (Liang et al., 2012). Algebra I receives a considerable amount of attention for its role as a “gatekeeper course” (Spielhagen, 2006, p. 31) in mathematics. Completion of Algebra I affects students’ access to advanced study in science and mathematics, as well as impacts postsecondary education opportunities and technically skilled job opportunities (Spielhagen, 2006; Stein, Kaufman, Sherman, & Hillen, 2011). Failing the Algebra EOC in ninth grade sets students back in their mathematics course progression, and students can be halted from moving on to higher mathematics courses. Reforms regarding Algebra I have largely focused on enrolling students in eighth grade to increase their chances of higher mathematics course attainment (Liang et al., 2012); students who are being retained in Algebra I in tenth grade face the prospect of falling even further behind their peers. Addressing failure of high-stakes exams is a pressing issue across all subjects, but this study focuses specifically on testing

in mathematics, as it receives a considerable amount of public attention (Schoenfeld, 2004; Vogler & Burton, 2010), amid efforts to improve students' learning outcomes.

Mathematics Instruction – Perspectives on Best Practices

In encouraging the development of mathematics mastery, researchers and practitioners have encouraged mathematics instruction to move away from low-level cognitive processes to practices that encourage on problem solving, reasoning, connections, and communication of mathematical ideas in written and oral forms (Schoenfeld, 2002). In doing so, instructional, curricular, and classroom factors have been identified as areas where the mathematics classroom could be improved to provide quality mathematics learning opportunities.

Consideration of how classrooms are structured can be a way to support mathematics learning. Prior research suggests mathematics classrooms be structured with flexible groups to enable students to collaborate and develop knowledge collectively (Jorgensen & Niesche, 2008; Silver, Mesa, Morris, Star, & Benken, 2009). Mathematics classrooms have long been arranged to have students work independently (Silver et al., 2009), which encourages students to view mathematics as a competition to develop knowledge (Anderson, 1990). Borgioli (2008) asserts that mathematics classrooms that encourage student participation and idea sharing support the development of mathematical understanding. Having students work collaboratively and explain and justify solutions to one another supports the development of mathematical understanding that is difficult to achieve through individual work (Hiebert et al., 1996; Silver et al., 2009). Through the use of collaborative activities, students come to recognize that learning is a shared process, and that they benefit from listening to one another and being exposed to different solving methods (Hiebert et al., 1996). As part of a mathematics classroom that supports and encourages student learning, the use of flexible grouping and collaboration has been an effective practice.

Considerations for mathematics improvement and reform should also consider pedagogical changes. There is also a call for teachers to move towards student-centered, engaging mathematics instruction and away from low-level cognitive instruction (Silver et al., 2009). To meet the various learning needs of a mathematics classroom, teachers must focus on individual learning preferences and interests in their pedagogical practice (Chamberlin & Powers, 2010; Little, Hauser, & Corbishley, 2009) to move towards a more engaging and complex mode of instruction. By changing the typical teacher-centered classroom and developing deep knowledge of students, teachers can craft instruction and activities that are appropriate for their students while also meeting high standards (Bonner & Adams, 2012; Sleeter, 2012). Utilizing a student-centered approach does not result in reduced rigor or learning, but instead can serve as a catalyst for increased student engagement in mathematics learning.

As part of more engaging instruction, teachers might also select problems and activities that require students to use reasoning and problem solving skills (Prawat, Remillard, Putnam, & Heaton, 1992), rather than typical problems that focus on low-level thinking (Ellis, 2008). Development of mathematics understanding is supported by tasks that are complex, problematic, and meaningful (Borgioli, 2008), with focus on mathematical reasoning rather than on finding the correct answer (Prawat et al., 1992). Utilizing complex problems and activities increases rigor while also providing students the opportunity to construct mastery and understanding, as opposed to procedure and recall. Some teachers have expressed concern that focus on problem solving detracts from learning basic procedures (Putnam, Heaton, Prawat, & Remillard, 1992; Rickard, 2005), but Schoenfeld (2002) asserts that selecting problem-oriented activities and problems does not automatically disregard basic skills, and does not necessarily preclude students from engaging in more complex work. Rather, as part of developing background

knowledge of students, teachers can craft problems and activities that are grounded in domains and contexts familiar to students, supporting students to tackle more complex mathematical work (Putnam et al., 1992). In encouraging improvement in mathematics and student mastery, students are well-supported by problems and activities that let them engage with mathematics in meaningful ways (Schoenfeld, 2002). Changing the types of problems that students engage with can be a tool to support students as they development conceptual understanding of mathematics.

To supplement engaging mathematics instruction that supports learning and mastery, the use of high-quality curriculum is a key component. Typically, K-8 mathematics curriculum can be characterized as “incoherent, cursory, and repetitive,” with disproportionate focus on number and operations over other content areas (Silver et al., 2009, p. 503). As part of efforts to improve mathematics learning outcomes, curriculum that has depth, draws connections between mathematical concepts, and allows for multiple entry points is critical for reform efforts (Jorgensen & Niesche, 2008). In efforts to provide quality mathematics learning opportunities to students, curriculum is a factor that can leverage instruction that encourages critical thinking and problem solving, in line with aims of mathematics reforms (Schoenfeld, 2002). A high-quality curriculum is particularly necessary for students who have been labeled as low-achievers, as curriculum in their classes tends to be of lower quality than that of high-achieving students (Lumpkins, Parker, & Hall, 1991). In conjunction with pedagogical changes that support student learning and mastery, use of high-quality curriculum can be a catalyst for improvement of students’ mathematical learning (Jorgensen & Niesche, 2008).

Issues in Policy Approaches to Improving Students’ Mathematics Performance

By virtue of being located external to the classroom, policy approaches at mathematics improvement have typically employed standardization and assessment to affect change (Sleeter,

2012). While standards can establish and communicate expectations for student learning and mastery (Sleeter, 2005), and assessments can support diagnostic assessment of student progression and communication (Little et al., 2009), these approaches do not directly address the interactions in the instructional core that result in learning (City, Elmore, Fiarman, & Teitel, 2009). City et al. (2009) note that previous policy attempts at educational reform have failed due to lack of attention to the instructional core, which consists of interactions between teachers, students, and content. For student learning to improve, the following are necessary: increase in the instructional knowledge and skill of teachers, increase in the level and complexity of student material, and change in the role of the student in the instructional process (City et al., 2009). Policies that fail to address the development of teachers' instructional capacity, the student role in the classroom, and the presence of high-quality content are unlikely to enact deep or sustained change in students' mathematical learning outcomes.

Prior research has raised issue with the use of high-stakes testing as a policy tool to improve mathematics learning. With the increase of standardized testing under NCLB, Ellis (2008) raised concerns that testing practices reinforce stratification of students, as it classifies students based on presumed mathematical ability, which then serve as the basis for resource distribution (Ellis, 2008). Students labeled as low-achieving in math continue to receive low-quality instruction (Gamoran, Porter, Smithson, & White, 1997), with resources directed to students who are on the cusp of proficiency (Ellis, 2008) in order to meet the metrics set by external parties. The practice of labeling students' based on perceive mathematical ability also reinforces the notion of mathematics as an elite subject that is not meant for all to master (Apple, 1992; Ellis, 2008), which runs counter to the efforts to engage all students in mathematics and ensure high expectations for all. Testing can be a positive facet of the learning progress when

used to inform progress and provide feedback to teachers (Ellis, 2008; Little et al., 2009). Issues with high-stakes testing arise when school resources and efforts are directed at meeting score or pass rate metrics instead of on student learning (Ellis, 2008). As part of education policy, high-stakes testing must be re-examined to ensure that it communicates understanding to students and parents, and rather than to saddle students, teachers, and schools with deleterious labels.

Policy attempts at mathematics reform would be strengthened with attention to developing and bolstering teachers' instructional practices. As discussed by City et al. (2009), reforms must address teacher capacity and provide professional learning opportunities for teachers to revisit their practice. Additionally, professional learning can provide teachers with the opportunity to reflect on their own beliefs about mathematics learning, which factor into instructional decisions (Prawat et al., 1992). Without professional learning opportunities to enable teachers to explore these beliefs, reform efforts are liable to be ignored or marginalized by teachers who do not see the connection between the reform and their own practice (Cohen & Hill, 2001; Sleeter, 2012). Professional learning attached to policy efforts must be sustained in order to provide ample opportunity for teachers to determine how their instructional practice may need to be amended in the context of reform (Cohen & Hill, 2001; Shields & Knapp, 1997). In their study of mathematics reform in California, Cohen & Hill (2001) found that successful professional learning provided teachers with time to work with the curricula and assessments that would be implemented. Opportunities for teachers to engage directly with the changes being instituted could be a lever to improve teacher understanding and response to policy changes. With attention to teachers' instructional practice and capacity, policy attempts at mathematics reform could better address the learning mechanisms that contribute to improve student learning outcomes (Roderick & Engel, 2001). In supporting and bolstering teachers' instructional

practices, reform efforts would strengthen a key component of the instructional core.

Additionally, in policy attempts to improve mathematics learning outcomes, teachers would also be bolstered by resources that attend to teachers' beliefs and values (Cohen & Hill, 2001). Teachers' responses to and enactment of policies are mediated by their practices and beliefs regarding teaching and subject matter (Coburn, 2004; Cohen & Hill, 2001; Spillane, 1999). Failure to attend to teachers' beliefs, or lack of opportunities for teachers to explore and engage with these beliefs, may lead to policies being marginalized by teachers at the classroom level (Cohen & Hill, 2001). In examining high-stakes testing policy in particular, Spillane (1999) noted that such a policy impacts the core dimensions of teaching, and implementation may necessitate substantial change to teachers' deeply rooted understandings and beliefs regarding instructional practice. Without opportunities for teachers to learn deeply about high-stakes testing policy and to wrestle with how their beliefs may or may not coincide with the policy, teachers may not implement or engage with the policy as designed. Despite presumptions that policies will be implemented in a standard way, the manner in which individual teachers understand and enact policies at the classroom level is heavily impacted by their perceptions and beliefs (Diamond, 2012; Palmer & Rangel, 2011). In policy efforts, attention to learning opportunities and consideration for teacher beliefs could be crucial for sustained efforts.

Spillane (1999) asserts the need to examine how the operationalization of reform ideas is mediated by the teacher's *zone of enactment*, which encompasses consideration of the interactions between context and personal factors. While institutional and sociopolitical contexts do impact teachers' practice (Cobb et al., 2003), these factors must also be analyzed alongside teachers' beliefs and values, all of which influence teachers' views of instructional practice, as well as view of policy reform efforts. In evaluating the impact of existing high-stakes testing

policy, the goal of this study to is to draw upon prior research and understand how institutional context, including personnel and resources, interacts with individual teacher beliefs, perspectives, and experiences in secondary mathematics teachers' instructional decision-making.

Conceptual Framework

The use of high-stakes testing reflects a bureaucratic/rational choice approach to organizational change, which Diamond (2007) describes as the application of rewards and sanctions that are meaningful to school personnel in order to produce behavioral change. Part of high-stakes testing is also an assumption of cause-and-effect: by holding teachers and students responsible and accountable for test performance, the system exerts influence to obtain the desired output of high academic performance from students (Au, 2009; Ullucci & Spencer, 2009). However, prior research has identified multiple factors that influence student achievement, both at the personal and institutional level, that are not directly impacted by high-stakes testing. The effects of instructional quality have been frequently highlighted as a major factor in student learning and achievement (Darling-Hammond, 2004; Darling-Hammond & Rustique-Forrester, 2005), indicating that high-stakes testing alone is not a guarantor of improved student learning outcomes. While high-stakes testing may induce changes in institutional or personal behavior, these changes are not guaranteed lead to uniform improvement in student achievement. To better understand the impact of high-stakes testing on learning, a broader examination of its impact on the classroom is necessary.

High-stakes testing represents an attempt to “recouple” (Diamond, 2012; Hallett, 2010) the policy and schooling spheres. In recoupling, the goal is to tighten the relationship between schools and policy governance, with policymakers able to exercise influence over the actions of school personnel (Diamond, 2007). With high-stakes testing, the policy sphere is able to exert tighter control over facets of classroom practice (Diamond, 2012), which has the effect of “making it difficult for schools to enact ceremonial compliance while doing different things behind classroom doors” (Hallett, 2010, p. 57). However, Diamond (2012) noted that while high-

Zone of Enactment (Spillane, 1999)

- Capacity
- Will
- Incentives/Disincentives
- Learning Opportunities

Teachers' Instructional Decision-Making

stake testing does allow for a closer relationship between the policy and schooling spheres, this recoupling is partial, with increased control over some facets of classroom practice, but looser control over others. Though the implementation of high-stakes testing systems enables the policy sphere to have a closer relationship with the schooling sphere, it does not account for the critical role of teachers as policy mediator and enactor (Cohen & Hill, 2001; Cohen, Moffit, & Goldin, 2007). To better understand the recoupling effects of high-stakes testing and its implications for student learning, the focus here is on teachers and their instructional responses to state testing, as a way to understand the role of teachers in testing policy, and the impact testing may have on their instructional decision-making within the classroom.

Administrators
Peers
Professional Development
(from state, district, and school)

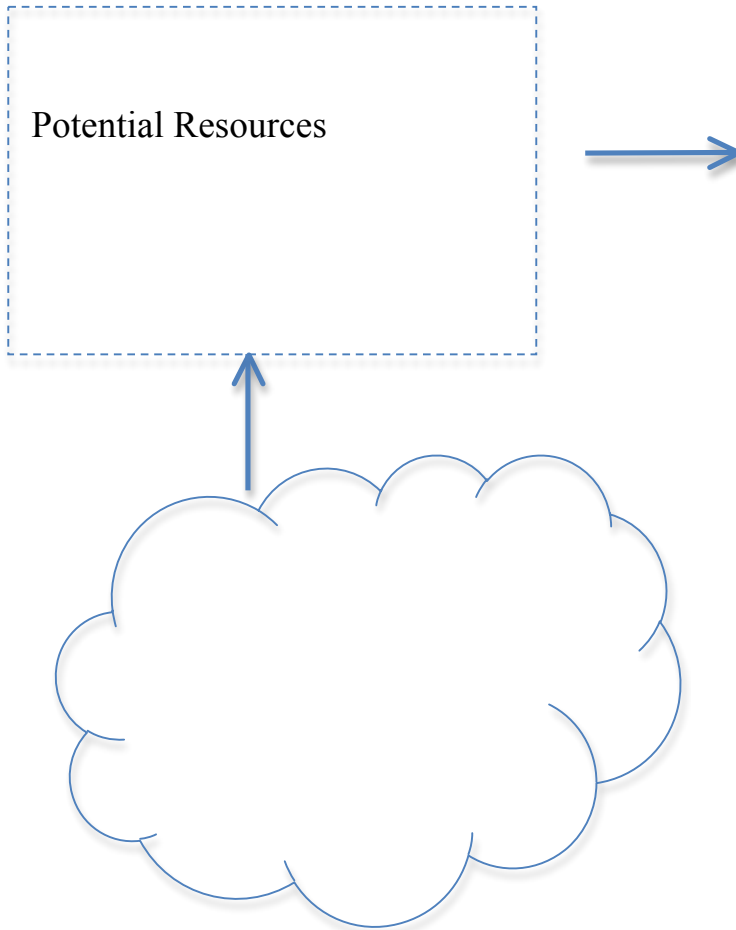


Figure 1. Conceptual framework of instructional change

Spillane's (1999) discussion of the zone of enactment guided this study's examination of the impact of EOC testing policy on instructional response and decision-making. The *zone of enactment* encapsulates interactions between *capacity*, *will*, *prior practice*, *incentives*, and *learning opportunities*, which then impact the enactment of reform ideas (Spillane, 1999). Within this space, teachers "notice, construe, construct, and operationalize the instructional ideas advocated by reformers" (Spillane, 1999, p. 144). *Capacity* as conceptualized by Spillane concerns both ability to learn about the reform itself and ability to enact reform in practice. Spillane conceptualizes *will* as teacher motivation to change practice to carry out reform recommendations. Within this framework, Spillane looks at *prior practice* in terms of teachers' instructional experiences, *incentives* as inducements provided for teachers to change their practice, and *learning opportunities* as opportunities to learn deeply about reforms and their expected changes to practice. In response to EOC testing policy, the interactions between will and capacity with prior experiences and learning opportunities can be examined to understand how individual teachers' zones of enactment mediate their instructional response to the exam.

Considering literature on the effect of teacher beliefs and values on policy response (Coburn, 2004; Cohen & Hill, 2001), Spillane's (1999) framework enables examination of how teachers' prior experiences and perceptions interact in response to policy. Additionally, the zone of enactment facilitates examination of the resources and learning opportunities provided for teachers to become familiar with policy efforts, as well as to focus on instructional practice. Funding or resources can be provided to support teachers in capacity building and those provided specifically for EOC testing were examined. The broader intent is to examine how individual zones of enactment impact teachers' responses to EOC testing policy.

This study also focused on the impact the zone of enactment may have on teachers' instructional decision-making, within the context of students who have previously failed the Algebra I EOC exam. In terms of instructional decision-making, teachers' curricular and pedagogical decisions were studied to examine what influence EOC testing might have on these decisions (Amador & Lamberg, 2013), and how these decisions might differ for students who have and have not passed the EOC. With high-stakes test items often based on state standards, the possible influence of standards on curricular coverage decisions were examined (Amador & Lamberg, 2013; Dingman, 2010). Prior research has also raised concerns about the pedagogical approaches teachers have used within the context of high-stakes testing, particularly those that focus on recall and rote memorization in hopes of improving students' performance on exams (Darling-Hammond, 2010; McNeil, 2000). As a result, focus is placed on the approaches teachers make use of, and how the presence of EOC testing might influence those choices.

Of particular interest in examining the zone of enactment was the impact of prior practice and learning opportunities on instructional decisions. This study examined how teachers' will and capacity relates to enactment of EOC testing policy in the classroom, as well as the effect teachers' prior practice and learning opportunities on instructional decisions. Spillane (1999) noted that there is a marked difference between willingness to enact policy and willingness to change instructional practice. Based on Spillane's (1999) discussion of teacher implementation of policy, the manner in which teacher will, capacity, and prior practice interacts with incentives and learning opportunities in regards to EOC testing policy was discussed. Within the zone of enactment, there was also specific focus on the resources that are provided for teacher learning, and what impact these resources may have had on the instructional decisions teachers made within an institutional context that includes EOC testing.

Based on prior literature, learning opportunities and peers were examined to understand the resources teachers draw upon to understand and incorporate EOC testing policy into instructional practice. Particular attention was directed to the resources that teachers were provided to respond to these retakers in particular, and the ways these resources interacted with teachers' experiences and beliefs regarding mathematical instruction (Cohen & Hill, 2001). For EOC testing to have positive impact on student learning outcomes, teacher capacity must be improved to enable responsiveness to student needs (Roderick & Engel, 2001), necessitating focus on the resources that were provided for teachers to strengthen capacity, and identifying the resources teachers found most valuable for the purposes of learning about and enacting change.

School-level colleagues occupy a central role in shaping teachers' approaches to instructional practice, as well as teachers' responses to reform (Cohen & Hill, 2001; Horn, 2010). While instructional practice can be individualized and isolated, peer influence and collaboration have been identified as key factors in instructional improvement (Horn, 2010; King, 2004). With teacher knowledge constructed through social, cultural, and historical factors, the influence of peers in this process is significant (Horn, 2010; Park, Oliver, Johnson, Graham, & Oppong, 2007). The interactions teachers share among one another have a noticeable impact on the development of instructional knowledge (Park et al., 2007), rendering peers a critical resource for classroom practice. As part of the learning community that can develop within schools, leadership can foster and structure collaboration and relationships that encourage teachers to learn in a collective (King, 2004). King (2004) also points out that school leaders can ensure that teachers have access to learning opportunities and resources that support teachers as they bolster practice. Based on this prior research, the role of peers in instructional decision-making and responses to EOC testing policy are included in the study framework.

Professional learning opportunities have also been identified in literature as a factor influencing teacher capacity and practice (Cohen & Hill, 2001; King, 2004; Shields & Knapp, 1997). In the context of reform efforts, opportunities must be provided for teachers to interact with and understand the changes being set forth (Coburn, 2004; Cohen & Hill, 2001). These learning opportunities must be grounded in the context of reform, rather than focus on issues or topics that are not pertinent (King, 2004), supporting teachers as they familiarize themselves and understand how their practice is being affected. More broadly, sustained learning opportunities support teachers to bolster instructional practice (Shields & Knapp, 1997; Thoonen, Slegers, Oort, & Thea, 2012). Professional learning opportunities support the development and strengthening of capacity, facilitating teacher change and growth (Thoonen et al., 2012). Without ensuring that structure for improvement and learning is in place, reform efforts are at risk of being marginalized. Implementation of sustained professional learning opportunities supports the improvement of instructional practice, while also supporting reform mandated change.

Additionally, professional learning opportunities must address teachers' beliefs, values, and practices, which have strong bearing on their practice (Coburn, 2004; Cohen & Hill, 2001). Reform efforts may entail significant changes to teachers' understandings and beliefs regarding instruction, student learning, and subject matter (Spillane, 1999). Failure to attend to these beliefs and understandings may result in teachers marginalizing reform efforts, or only adopting those that fit with existing schemas (Cohen & Hill, 2001). Coburn (2004) notes that teacher response to policy and reform is mediated by beliefs and practices, which can be intractable. Attempts to alter teachers' instructional practice must consider congruence with teachers' existing beliefs, values, and practices regarding instruction, as these guide classroom practices (Coburn, 2004). With this in mind, opportunities for teachers to examine and address their

beliefs, values, and practices in the context of policy change are included in the study.

There are multiple resources that teachers draw upon in developing their capacity and instructional decision-making; examining the role of peers and professional learning opportunities is only the start. These two are highlighted based on their presence in literature as influences on instructional practice, but data collection also ensured teachers were able to self-identify the resources that are most pertinent to their individual practice. Teachers were asked to discuss the resources they draw upon in development and bolstering of their capacity, and the resources they drew upon in instructional decision-making within the context of the EOC. Part of data collection also focused on what teachers identify as resources for their capacity to respond to students who must retake the Algebra I EOC, and how this related to the instructional decisions that were made in response to students' learning needs.

These resources were analyzed within the context of the zone of enactment to examine what impact might be observed on teachers' instructional decision-making. The interactions Spillane (1999) identifies within the zone of enactment were examined to see how they guide teacher understanding of EOC testing policy, and in turn, the instructional decisions made in response. Within the broader sociopolitical context that necessitates students pass the exam (Cobb et al., 2003), the instructional decisions made to prepare students to pass were the focus of data collection and analysis, particularly for those students who had exhibited prior difficulty with the exam. The role of the school in these processes was examined, looking at the resources that are provided, and which of these resources teachers identify as contributing to their instructional decision-making and classroom practice.

The focus of this study is to examine individual teacher responses to EOC testing policy, and the manner in which testing affects their instructional decision-making, by way of focus on

the zone of enactment. In examining teachers instructional decision-making, attention was directed to the curricular and pedagogical decisions teachers enacted within their classrooms. With the multitude of factors that influence instructional decision-making, whether personal, institutional, and sociopolitical, the goal was to explicate how these factors coincide and mediate the influence of policy on teacher practice. In data collection and analysis, focus was placed on the facets of Spillane's (1999) zone of enactment, looking at how teachers' beliefs, perceptions, and experiences interacted with their capacity, will, learning opportunities, incentives, and disincentives in their responses to EOC testing policy and preparing students to pass.

Methods

With focus on explicating and understanding teachers' experiences and perspectives, qualitative methodology was selected to facilitate in-depth examination of the interactions of teachers, their institutional context, and their practices (Amador & Lamberg, 2013). The intent of this study was to understand teachers' experiences and the meanings attributed to these experiences, making case study methodology fitting. Case study methodology allows for the delineation of particular subjects as the *bounded system* under study for in-depth description and analysis, narrowing focus on individuals for study (Merriam, 2009). By focusing on a small number of teachers, the intent was to enable in-depth examinations of experience and perceptions (Patton, 2003), and understand how these insights might contribute to understanding of the impact of testing policy on the classroom, particularly for students who have had experienced prior failure on high-stakes exams. Use of qualitative methodology also allows for capturing teachers' stories and perceptions, which can provide insight into local-level experiences that are not always represented or evident in quantitative data.

Setting and Participants

Purposeful sampling enabled narrowing down a number of schools to contact, and identification of schools willing to participate (Merriam, 2009). Public comprehensive high schools in the Puget Sound area were the focus of this study, with specific attention to schools with EOC pass rates below 50% in both subject exams. Of schools that met this criterion, principals were emailed to gauge interest in participation. One high school that met this criteria in the South Sound region agreed to be part of this study.

Springfield High School⁴ (SHS) is a four-year comprehensive high school in a mid-sized

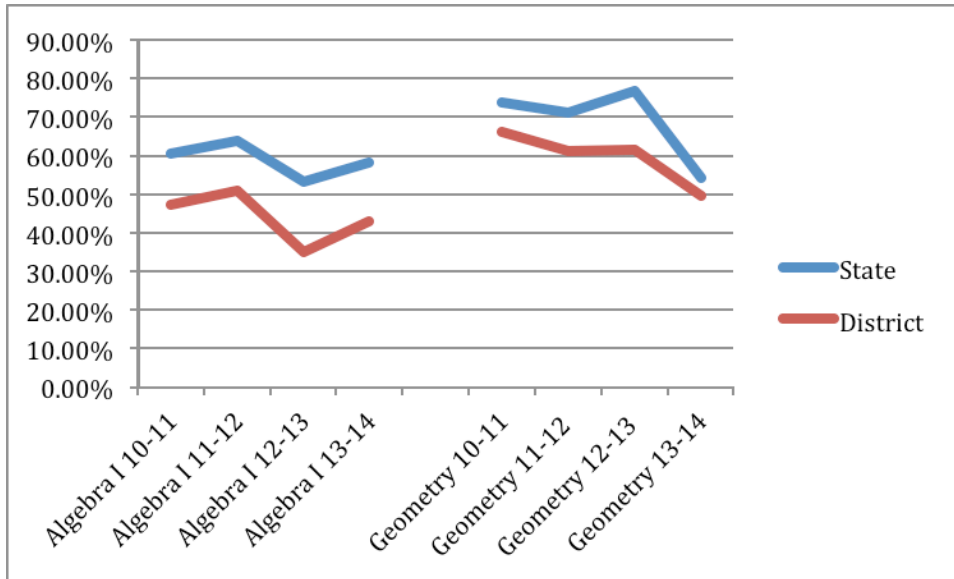
⁴ Pseudonyms for school and teacher names are used throughout.

suburban city in Washington State, with just under 1,500 students enrolled (as of May 2014). SHS is divided into three academies, with different faculty and electives in each academy, though graduation requirements are standard across the academies. Over the last five years, there has been slight growth in student enrollment, with increasing diversity in the student population. The school reflects the racial and ethnic diversity (58.7% students are minorities) observed throughout the school district, with a growing transitional bilingual student population (3.3%). SHS is not a Title I school, though approximately 45% of its students qualify for free or reduced-price meals. Classes are inclusion for the approximately 12% of students who qualify for Special Education (all data from Washington State Office of Superintendent of Public Instruction).

Focusing specifically on Algebra I and Geometry as EOC-tested subjects, two SHS mathematics teachers were the case study focus of this study. It was necessary for participants to teach at least one EOC-tested subject, as well as have experience with students who have previously failed an EOC mathematics exam. Through recommendations from SHS Principal Edna and email invitations to members of the SHS mathematics department, Minerva and Sam agreed to be participants. Principal Edna recommended Minerva as an exemplary mathematics teacher who had considerable experience in the classroom with multiple course subjects. I emailed other SHS mathematics teachers whom Minerva suggested might be receptive to participating in the study. Sam agreed to be a participant and provided a different perspective as a novice teacher. Both were informed that consent and participation were strictly voluntary, and that pseudonyms would be assigned to maintain confidentiality. Both teachers were asked to share their experiences and beliefs regarding their mathematics instruction, their experiences within the SHS mathematics department and school, and what impact EOC testing may have on their instructional practice. Descriptions of these teachers, their instructional beliefs, and

pedagogical practices will be further discussed in detail in a subsequent chapter.

While the district as a whole has mathematics EOC pass rates⁵ below state average, Washington State OSPI data indicates there are particular issues with the Algebra I EOC, particularly as older students attempt to pass the exam.



Pass rates for students, disaggregated by year for the Algebra I and Geometry EOC exams, excluding retakers. Data from WA OSPI.

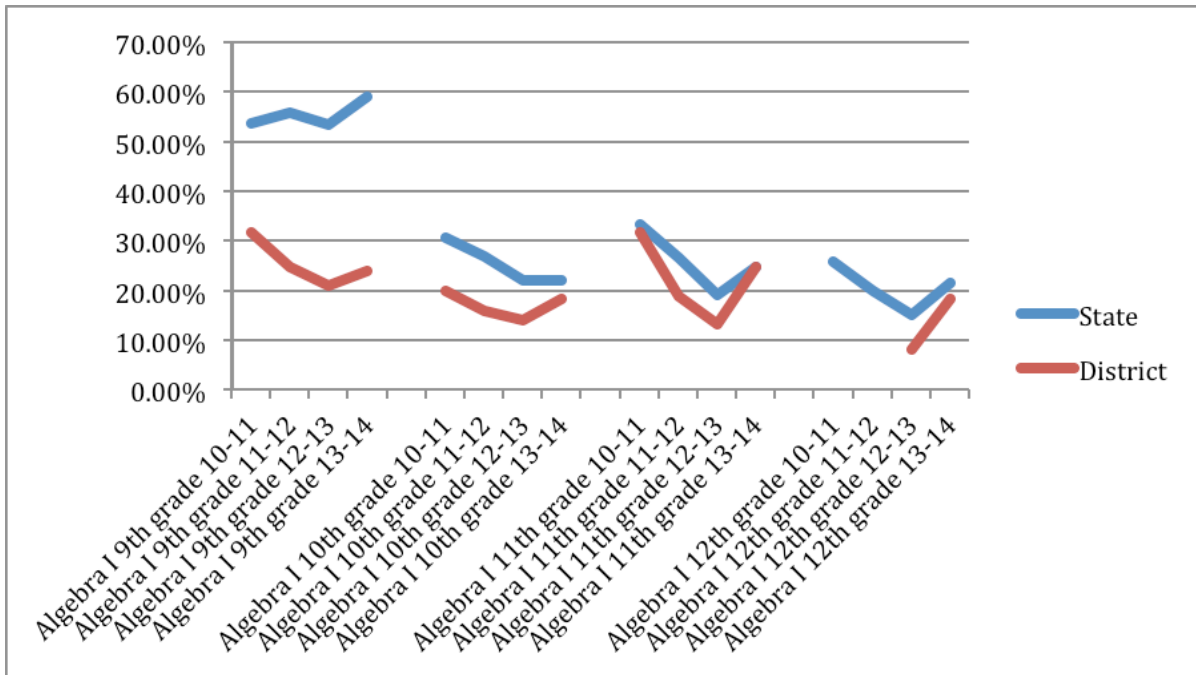
Looking at SHS comparatively, pass rates for both EOC mathematics exams are lower than those of the state and district, though SHS is progressing in terms of the Geometry EOC exam pass rate⁶. More troubling is the relatively low pass rate for Algebra I, both at the district and school levels. Additionally, student pass rates on the Geometry EOC exam declined for the 2013-14 academic year, which is another trend that should be further examined. SHS has made increasing the Algebra I EOC pass rate a priority, one that is shared across district and school

⁵ Per Washington State OSPI Report Card (reportcard.ospi.k12.wa.us/), EOC results are disaggregated into four levels: level four (exceeds standard), level three (met standard), level two (below standard), and level one (well below standard). In order to pass an EOC exam, students must score at level three or four.

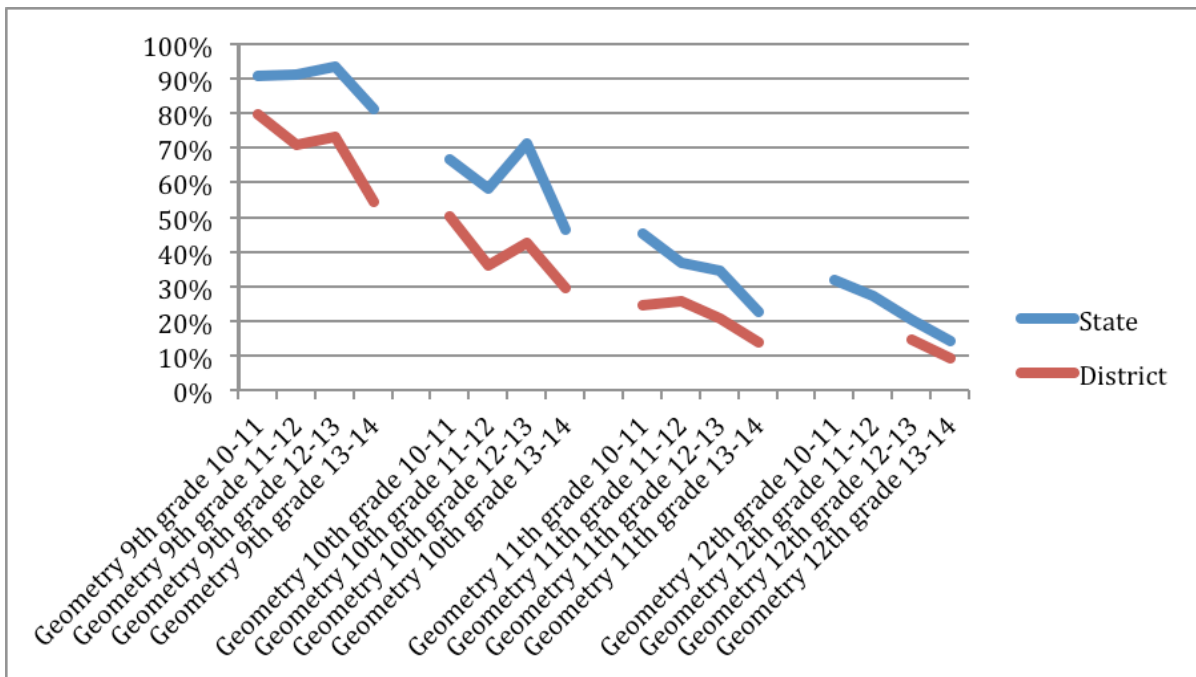
⁶ In order to ensure the anonymity of SHS, the school's pass rates have been omitted from these charts. Their pass rates were also taken from Washington OSPI and included in analysis.

leaders, though data points at more widespread issues with students passing the exam.

Institutional initiatives at SHS focused on increasing EOC mathematics pass rates, specifically in Algebra I, will be discussed in subsequent sections.



Pass rates for the Algebra I EOC, disaggregated by grade level and year, excluding retakers. Data from WA OSPI.



Pass rates for the Geometry EOC, disaggregated by grade level and year, excluding retakers. Data from WA OSPI.

Similar to what was observed by Liang et al. (2012), students taking these high-stakes exams in the latter parts of their academic careers are demonstrating greater difficulty with passing. Trends observed in SHS data mirror what is occurring at the district and state levels, with steep declines in pass rates for eleventh and twelfth grade students across both exams. Overall, there is a concern with the low pass rates for the EOC mathematics exams and the number of students who must retake one of these exams, and potentially retake the class as well.

Data Collection

Semi-Structured Interviews. Primary data collection commenced in January 2014 and was completed in June 2014, after the EOC exams had been administered, with follow-up interviews in September 2014, after EOC results had been sent to teachers. Semi-structured interviews served as the key mode of data collection, as they supported understanding of teachers' experiences and perspectives as they relate to the phenomenon under study (Patton, 2003). The initial interview asked teachers to discuss their instructional beliefs, their prior experiences with EOC testing, their instructional strategies and choices, particularly for students who had failed a mathematics EOC exam, and the resources they drew upon in their instructional practice. Subsequent interviews were conducted after classroom observations and focused on teacher reflections of the lesson, the process of developing the lesson or unit, and the influence EOC testing may have had on the process. Keeping in mind individual zones of enactment, teachers were also asked to discuss the resources they drew upon in these interviews. In the interview conducted after EOC administration, teachers were asked to reflect on the time period leading up to the test, and what instructional choices were made and enacted in the classroom during this time. Teachers were also asked to reflect on the academic year and share their thoughts about instructional planning throughout the year, as well as the different influences and

factors that impacted their practice. Follow-up interviews were conducted in late August and early September, after the 2013-14 EOC scores had been returned, to get a sense of teachers' thoughts on these results, the efficacy of their instruction and EOC preparation, and how student results might impact their instructional plans for the upcoming academic year.

Throughout the interviews, teachers were asked to reflect on their instructional decisions and how different elements within the institutional context impacted those decisions (Amador & Lamberg, 2013), as well as how they individually responded to similar challenges in their teaching environments (Spillane, 1999). The goal of these interviews was to have teachers describe their experiences within the classroom and how they responded to the multiple demands that emanate from the policy and institutional spheres (Amador & Lamberg, 2013), and what influence EOC testing policy may have on their instructional decision-making.

Classroom Observations. To support deeper understanding of teachers' instructional decision-making, their classrooms were observed during the data collection period. This was done in order to observe the curricular content of each teacher's lessons and how content might coincide with EOC testing considerations. Each teacher's classroom was observed 2-5 times; in Minerva's classroom, both of her Geometry periods (A and B blocks) were observed, and in Sam's classroom, all three of his Algebra I periods (A, B, and C blocks) were observed. Of the periods of these teachers' classrooms, all their students were preparing to take the mathematics EOC exams, whether for the first time or upon retake. Classroom observations allowed for recording of instances where EOC testing might have been brought up, either by the teacher or students, and how testing was discussed in the classroom. During classroom observations, field notes were recorded to keep record of how each teacher structured their classroom, the way lessons were structured and delivered, and the choice of activities used. Particular attention was

also paid to instances where the EOC was discussed, whether brought up by teacher or student. These were non-participant observations, with no collection of student data. Classroom observations were key in triangulating data regarding instructional decision-making, and provided insights into how the teachers incorporated EOC test considerations in their classrooms.

Document Selection and Analysis. Document selection and analysis was also conducted to further triangulate data sources and examine some of the resources provided to teachers, both in terms of instructional support and for understanding EOC testing policy. Examining teacher documents also supported analysis of instructional decision-making. During classroom observations, teachers shared lesson worksheets and handouts, which further facilitated understanding of teachers' instructional decisions and strategies. Teachers also shared documents and web resources intended to be professional learning sources, either from the state, district, or colleagues. In terms of EOC testing, support came primarily from the Washington OSPI site, or from the district site. The majority of documents examined were of instructional resources that were shared among building colleagues, or from online teacher resources. Document analysis supported understanding of the resources used in teachers' capacity building, both in terms of policy understanding and instructional decision-making.

Data Analysis

With consent from teachers, interviews were audio recorded and transcribed for coding purposes. Though the majority of interviews were conducted in-person, some had to be conducted over email due to time constraints. Open coding was conducted on each transcript and field note to ascertain emerging ideas and themes (Emerson, Fretz, & Shaw, 1995; Merriam, 2009) related to instruction, EOC testing, and influences on instructional practice. From the open coding process, a working set of codes was created to examine commonalities, differences,

patterns, and structures across the cases (Coffey & Atkinson, 1996); as analysis continued, codes were added to be more refined and detailed. For example, at the onset of analysis, a code created to mark instances where teachers discussed anything related to instructional practices or decisions (INSTR). As analysis continued, this code was further nuanced to delineate between teachers' instructional beliefs (INSTR BELIEF), the instructional considerations that went into their practice (INSTR CONSID), the instructional decisions that were implemented in the classroom (INSTR DECISION), and the rationale for these instructional decisions (INSTR RATIONALE). Continued analysis allowed for codes to be reworked and narrowed to highlight different aspects of these teachers' instructional decision-making processes. As other themes emerged, additional codes were created and later refined for data analysis.

Drawing from grounded theory methodology, data collection and analysis occurred simultaneously, with focus on developing conceptual categories throughout the process (Charmaz, 2001). Grounded theory methods also enabled focus on the meanings participants attribute to their actions (Charmaz, 2001), which in turn supported explication of thoughts and perspectives behind the instructional decisions teachers made. With a set of working analytic codes, HyperRESEARCH (version 3.5.2) was then used to apply these codes to transcripts and field notes. HyperRESEARCH enabled organization and examination of emerging themes across the data sources. Analysis was organized according to participant, event, and data source, with within- and cross-case analysis conducted (Merriam, 2009).

By concurrently collecting and analyzing data, the goal was to have analysis inform and bolster data collection. Field notes from classroom observations were used to develop questions for follow-up interviews. Observations also enabled verification of the instructional decisions teachers described during interviews. For instance, Minerva described her instructional decisions

as grounded in standards-based instruction, so observations of her classroom looked for verification of this practice. Interview transcripts and field notes were collectively used to confirm and develop additional questions for understanding and clarification.

Member checks were conducted to bolster internal validity and provide participants an opportunity to respond to analysis and findings (Lincoln & Guba, 1985). Interview transcripts and field notes were made available to participants, who then had opportunities to respond to the representations and assertions made (Lincoln & Guba, 1985).

Ethical and IRB Considerations

University of Washington Institutional Review Board (IRB) protocol was closely followed in the development and enactment of this study. The school and participating teachers were provided IRB documentation indicating that the university had approved this study. Consent forms were also distributed to the principal and participating teachers to obtain informed consent; these forms outlined the study framework and research protocol, as well as assured participants that their involvement was voluntary and could be terminated at any time. Copies of consent forms were provided to participants. Participants were also assured that all efforts would be made to maintain confidentiality, with pseudonyms assigned to participants and their school. To protect student confidentiality, field notes from observations omitted identifying information. Audio files were transcribed and omitted identifying information, and all data files have been stored on a password-protected computer that is accessed only by the researcher.

Limitations

The purpose of this study is to develop insight into a small case of teachers, rather than to develop generalizations (Patton, 2003). Findings from this study are not intended for generalization to other cases, though these participants can provide “working hypotheses”

(Merriam, 2009, p. 225) and illustrative examples with regards to practitioner decisions. With purposeful sampling of selected cases, there will be constraints on the application of findings to teachers in different contexts (Patton, 2003). The purposeful sampling did omit the perspectives of middle school teachers, who may also teach Algebra I and Geometry, and have different insights regarding their zones of enactment. Though the decision to focus on high school teachers is an intentional choice to concentrate on teachers whose students are impacted by the graduation implications of testing (Vogler & Burton, 2010), the perspective of middle school teachers would contribute to further understanding of teachers' instructional decision-making and practice in the context of EOC testing. Though there are limits on the generalizability of this study's findings, Merriam (2009) notes that findings from qualitative research can contribute to understanding of other comparable situations and contexts.

To attempt to mitigate researcher effects, member checks and data triangulation were included to strengthen the validity of findings (Merriam, 2009). Analytic memos and interview transcripts were shared with both participants. Participants shared their thoughts with the author in person and over email. Additionally, analysis of different data sources was compared and cross-checked to confirm emerging findings (Merriam, 2009).

The analytic process was likely be affected by the author's disciplinary background and interests (Emerson et al., 1995). The author's background in sociology and educational studies frame this work. The author's research interests center around the impact of education policies on the classroom, and include an interest in the efficacy and suitability of high-stakes testing in K-12 education. The author had no prior relationship with the participants prior to the study.

Introduction to Participants

As part of examining the context in which each teacher's instructional practice occurs, this section provide insights into their instructional beliefs and how those beliefs interacted with perceptions regarding EOC testing in their instructional decision-making. During interviews, teachers discussed their beliefs about mathematics learning and how those beliefs factored into the instructional decisions they enacted in their classrooms. Both teachers also discussed the context of their classes, and how class composition factored into their instructional decision-making. In subsequent chapters, I will discuss the influence of EOC testing on instructional decisions, and the instructional considerations for students who are retaking a mathematics EOC exam, and potentially a mathematics course as well.

Institutional context will also be discussed, examining leadership and its actions related to teachers' instructional practice, particularly in its interactions with the mathematics department. As a result of the school's pattern of below average pass rates on the EOC mathematics exams, SHS has instituted initiatives targeted at supporting students to pass these exams. These efforts are discussed further in this chapter.

Participants' Instructional Beliefs and Practices

Minerva. Minerva came to SHS nine years ago, when she began her teaching career. Prior to teaching, Minerva's educational background and career were in engineering, principles of which carried over into her mathematics and arts classes. In addition to Geometry and AP Calculus, she previously taught Algebra I and Art classes at SHS.

In teaching secondary mathematics courses, Minerva believed that instruction should "build from conceptual understanding" through skill building and application (personal communication, January 24, 2014). Her instruction focused on breaking concepts into small

discreet parts, practicing to master each part, and then demonstrating how concepts linked together as part of mastery and understanding. In this way, Minerva intentionally built student confidence in skills that would support their development of a deeper understanding of mathematical concepts. As part of her instructional practice, Minerva discussed the relevance of mathematics to students' lives. She focused heavily on drawing connections in her instructional practice, demonstrating how mathematical understanding is linked across different secondary mathematics courses. When teaching Algebra I, Minerva remembered explaining to students how the algebraic skills they developed in her class would prepare them to take Calculus. She continued to draw those links in Geometry, and highlighted how mathematical understanding prepares students for career opportunities. Minerva's instruction was heavily grounded in encouraging students to develop conceptual understanding, and in showing students how mathematical understanding relates to their everyday lives and careers.

In discussions of instructional beliefs and practices, lesson planning included activity and movement, often having students sketch out ideas and use manipulatives. During the spring semester, Minerva received authorization from SHS administrators to purchase and set up panels all along her classroom's walls, which served as whiteboards for students to draw and work out problems. Lessons also drew from stories and real-life examples, with Minerva creating problems that reflected the application of mathematics in everyday life. In an observed lesson on proportionality and similarity, Minerva demonstrated the concepts' applications to scale models, architecture, and Boeing's manufacturing. For an activity during this lesson, she drew from "Alice in Wonderland" and had students to solve for Alice's measurements after she had shrunk. In this activity, students were encouraged to sketch out diagrams representing Alice's height for visual support in problem solving. Drawing from interviews and observations, there were clear

examples of Minerva using activity and movement in her instructional decisions.

Minerva also focused on building from discrete parts and drawing connections between them to a larger conceptual understanding. Her instruction incorporated what she termed “understanding by design” (personal communication, January 24, 2014): she started with what she wanted students to learn, then thought about how to structure lessons to support students toward that aim, with benchmark assessments incorporated throughout. When assigning homework and in-class work, Minerva noted she was extremely deliberate in her choices, stating, “I try to like scaffold my problems up in difficulty and, you know, be very transparent, but also when I pick problems for kids to practice, there’s a reason for every single problem” (personal communication, January 24, 2014). She thought deeply about the ways in which her problems and activities fit with one another, and how these problems fit with students’ development of conceptual mastery. Minerva’s instructional decisions were carefully selected, with attention to how instructional choices fit within larger content themes, as well to one another.

Minerva’s classes were also structured to encourage student ownership, with lessons designed to have students do the majority of the talking and work out problems with minimal teacher lecturing. Students in her classes were required to document their problem solving thought processes for sharing with the class, including their confusions and struggles so classmates could offer suggestions and support. By emphasizing student discussion in mathematics, Minerva’s intent was to encourage students to “engage and talk mathematically and make sense of the math” (personal communication, April 28, 2014). Through student engagement and ownership of classroom discourse, she bolstered her students’ confidence in mathematics and prepared them for new and unfamiliar concepts they might encounter. Her classes emphasized student communication of thought processes and problem solving, less so on

procedure or students finding the correct answer. These pedagogical choices were made with the explicit intent to place students in an ownership position.

In her lesson planning process, Minerva drew upon learning standards documents from Washington OSPI and the district, district learning progression documents, and materials from colleagues. Lessons from prior years were occasionally referenced, but this had become increasingly difficult given changes in state and district learning standards. Primarily, lesson plans were created by Minerva, which she described as difficult but enjoyable, or drawn from collaborators within the SHS mathematics department. She noted the lack of readily available curricular materials that address district and state Geometry learning standards simultaneously, as well as those that were designated as EOC-tested standards. In the absence of these curricular materials, Minerva elected to create her own for her instruction, with scant use of the district Geometry textbooks. While she recognized the lack of available curricular material as a challenge, she also admitted that she prefers to maintain control over her curriculum, adjusting content to fit with the standards-based approach to instruction that is characteristic of the SHS mathematics teachers. According to Minerva, standards-based instruction had been implemented across the district as a means of ensuring that all students across the district had access to rigorous and quality academics. While secondary mathematics teachers are responsible for covering learning standards, they are free to choose curricular materials that fit best for their students. Minerva's instructional decisions were based off of curricular materials that she created, as well as material that adequately addressed state and district learning standards.

With the variety in student background and knowledge levels, Minerva made regular use of student grouping as part of her instructional practice. She deliberately placed students into groups, typically of four students, with struggling students seated closest to her desk at the front

of the room. By positioning struggling students close to her, she felt could keep an eye on their progress and be close to offer support. In creating groups, Minerva considered how students worked together, and which students collaborated or supported one another well. These groups, which changed every few weeks, were used throughout class time. The use of grouping also supported English language learner (ELL) students, with Minerva seating students with similar linguistic backgrounds with one another for peer support. In concert with other instructional decisions, grouping supported Minerva in meet her Geometry students' varied learning needs.

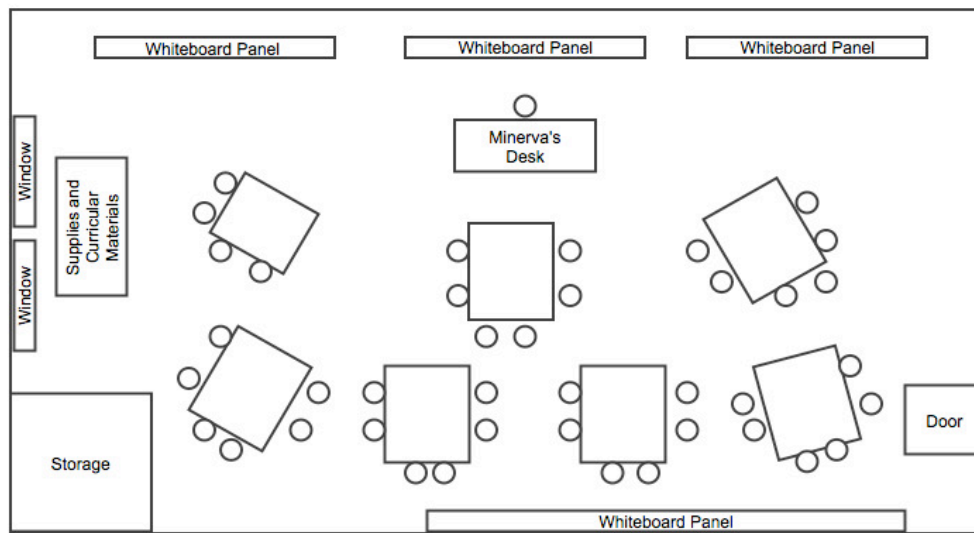


Figure 2. Minerva's classroom layout

For the 2013-14 academic year, her Geometry classes contained students from various grade levels, though the majority of her students were sophomores. Including prior years of Geometry instruction, her classes typically contained about 32 students, with the enrollment only once going below 30. Given the size of her classes, variations in students' mathematical knowledge and prior learning experiences were present, which factored into her instructional decisions and class structure. For the 2013-14 academic year, both of her Geometry periods contained a mix of students, some who had passed the Algebra I EOC and were taking Geometry

for the first time, others who had failed the Algebra I EOC but were moved ahead into Geometry, and some who had previously failed the Geometry EOC and were retaking the course.

SHS is an inclusion school, so both of Minerva's Geometry sections also had students with individualized education plans (IEPs) and 504s⁷, which contributed to considerations about how to meet students different learning needs: "And it's a workload issue for teacher, you know, just trying to make sure everybody's got what they need. 'Cause they all have different needs, and we have accommodate all of them, so that's huge, try to get para support" (personal communication, January 24, 2014). Lesson planning necessitated Minerva consider students' various learning needs, including the particular needs of students with special needs. While Minerva received some personnel support in her classes, not all personnel were specifically there for academic support. In one session, two of her students were deaf, so Minerva had two sign language interpreters to aid with language and vocabulary; interpreters were present to provide translation, not academic assistance. When creating groups and positioning them in the classroom, Minerva also ensured that students with IEPs and 504s were also seated close to her desk so she could observe their work, while also ensuring these students could continue to work with peers and support staff. During groupwork time, I observed Minerva walking around and checking on each group, with extra time spent with students with additional learning needs. For her deaf students, she made sure to check on their understanding of vocabulary terms, noting the numerous geometric terms that are part of curricula. When asked about planning lessons for classes with varied learning needs and preferences, Minerva discussed creating lessons and activities that offered multiple problem-solving options for students. Going back to the

⁷ An IEP is a plan or program that ensures children with identified disabilities received specialized instruction and services in K-12 schools, while a 504 is a plan that ensures children with identified disabilities receive accommodations that provide access to the learning environment and support academic success (University of Washington Disabilities, Opportunities, Internetworking, and Technology, 2015).

proportion activity with Alice in Wonderland, she provided multiple problems for students to grapple with, each with different entry points. In problem, students were asked to figure out Alice's height given a 10:15 ratio, with another problem asking students to find height given a 50: x ratio (field notes, February 24, 2014). In doing so, Minerva provided multiple entry points within the activity, supporting differentiation for students.

Based on interviews of Minerva and observations of her Geometry classroom, it was apparent that Minerva placed a great deal of importance on incorporating partner or group work into her instruction. By incorporating active group work into lessons, she believed she could reduce the amount of time spent directly lecturing, as her intent was to have a classroom structure that encourages students to share and communicate their thought processes. During the course of the observation period, Minerva had boards put up along all her classroom's walls, which provided space for students to write and work out problems. In every Geometry class that I observed, the majority of instructional time was set aside for students to either work on problems on the large boards, or on individual whiteboards. This may have been feasible due to the block scheduling structure at SHS, which ensured that students are in mathematics classes for 80 minutes. At the same time, Minerva's class structure was consistent with what she had laid out as her instructional beliefs and priorities. Her goal was to use connected concepts and activities to encourage students to develop broader understanding, which she felt best supported students for further mathematics learning and success.

Formative assessment was a prominent feature of her classroom, conducted during visual examinations of in-class work and homework, as well as through quizzes and tests. Frequent problem practice was part of each lesson, with students working on warm-up problems at the start of each class, either at their desks or on the boards. This way, Minerva could walk around

and gauge student understanding, as well as address any errors or misconceptions that arose. Minerva continuously and informally assessed students and their work during her classes. Having students share their problem solving strategies and thought processes with the class also served as an informal way for Minerva to gauge student understanding. Though she frequently employed assessments, Minerva expressed unease with standardized testing, particularly with the use of a single test score as a metric of student understanding. During a conversation about EOC testing, she noted, “I never ever think of that one test score that’s given on one morning and not necessarily ideal conditions for that child, to gauge how, what that child knows and how I’m doing as a teacher” (personal communication, January 24, 2014). Based on her instructional experience, Minerva found that a single assessment was insufficient for determining student mastery, and as such, she felt EOC exams were not the most accurate metric for students’ course learning. In discussing her instructional beliefs, she also expressed that her priorities were to develop students’ conceptual understanding and to prepare students for higher mathematics courses, not simply to pass an EOC exam – “It’s like if the learning happens, the test will be fine” (personal communication, January 24, 2014). Minerva believed that focus on student mastery and learning would support students passing standardized exams, rather than sole focus on test preparation. It was evident that Minerva’s concerns about assessment centered around the weight placed on one standardized test performance over her own regular assessments.

In discussing her focus on conceptual understanding and student communication in her instructional practice, Minerva was candid in noting the ways in which standardized testing is contrary to her practice. Minerva distinguished between assessment, which she frequently does in formal and informal means to gauge student understanding, and standardized testing, which she views as a political tool rather than an instructional tool. During discussions of standardized

testing, Minerva raised concerns with the use of a single test score as a definitive measure of student understanding, and with the potential reliability and validity issues that are attached to standardized testing, concerns that have also been raised by prior research (e.g., Ravitch, 2011; Zimmerman & Dibenedetto, 2008). Instead of relying on standardized testing results, Minerva relied upon her frequent in-class assessments to gauge her students' understanding.

Minerva viewed EOC testing as an improvement over typical comprehensive standardized testing. Since EOC exams are administered after completion of a course, and students are tested on concepts from one course, she prefers EOC testing to exams that draw from a hodgepodge of concepts. However, the different format of EOC exams does not ameliorate her concerns about the use of a single test metric as a basis for critical student placement and graduation decisions. Based on discussions with her students, she also questioned the efficacy of EOC testing as a motivator for learning, asserting that only her already high-performing students were positively encouraged by EOC testing. Similar to the doubts raised by Roderick and Engel (2001), Minerva was not convinced that EOC testing alone is an effective tool to encourage increased student learning, particularly for students who have demonstrated difficulties with mathematics previously. However, in terms of test format, she did express preference for the EOC format of standardized testing, which tests students on a single course and only after course completion, over the comprehensive form which tests students on a variety of mathematics course concepts, some of which students may not have broached in class.

Though Minerva preferred EOC testing to comprehensive standardized exams (such as Smarter Balanced, which will be implemented across Washington State), she still had lingering concerns about the weight placed on standardized test performance, particularly as it marginalized her in-class assessments of her students. Even though she regularly assessed her

students' mastery and understanding, Minerva lamented that SHS and district administrators focused on students' standardized exam performance as a metric for mastery, rather than her own assessments. She also pointed out that the EOC exams represent a single data point at one moment, while her assessments had been administered continuously throughout the year, giving her a detailed understanding of her students' understanding and progression, something she felt was not represented in EOC exams. Minerva viewed her assessments as the most accurate measure of student learning, and acknowledged frustration with her students' EOC exam performance being used as the prioritized metric for gauging students' subject mastery.

Collegial interactions and collaborations were a prominent feature of Minerva's lesson planning and reflections. She admitted that she had "never been the kind of teacher that goes into [the] classroom and closes the door and does whatever I want" (personal communication, April 28, 2014). From the start of her teaching career, Minerva regularly collaborated with colleagues, frequently sharing lesson plans and activities. SHS is divided into three academies, which serves to segment the school into concentrated learning communities. By virtue of her position as department chair, Minerva interacted regularly with all the mathematics teachers, though planning and collaboration most often occurred with academy colleagues. Minerva plans her Geometry lessons with Charlene, who is the newest member of the SHS mathematics department, so the two can keep a similar pacing schedule, share their ideas, and provide feedback to one another. She and colleagues shared curricular materials and drew from online resources rather than the Geometry textbook, and readily shared with one another within the academy. During informal discussions with Minerva and her academy colleagues, the National Council of Teachers of Mathematics (NCTM), the Mathematics Vision Project, Pinterest, and the Engage New York web sites were identified as curricular resources for their lesson planning and

instructional decision-making, material that they frequently shared with one another. From discussions with Minerva and informal observations of collegial interactions, it appeared that there was a great deal of collaboration in Minerva's instructional decision-making process.

Minerva's instructional beliefs regarding active learning, conceptual mastery, and continual assessment were readily apparent in discussions about her instructional decisions and observations of her practice. During observed classes, students were seen working primarily in groups, sharing strategies and examining others' work, while Minerva circled around the room to check in with students. The problems and activities she selected reflected out-of-school contexts and at times extended to career contexts, which was observed in her discussion of Boeing engineers utilizing proportionality in their work. Minerva held strong beliefs about mathematics instruction that would best support students as they developed conceptual mastery, and sought to draw upon these beliefs in her instructional decision-making. She was also resolute in the importance she places on the role of assessment in her instruction, as assessment enabled her to gauge her students' learning progress on a regular basis. However, within her instructional beliefs, Minerva did hold a cautious attitude towards standardized assessments, as she felt standardized test performance was overly prioritized, particularly as she viewed her own assessments as better gauges of student learning. Despite these misgivings, Minerva recognized the impact standardized testing could have on her students' academic progression, and focused on instruction and activities that would encourage their conceptual mastery, which would in turn prepare students for EOC testing. Her broader focus was on engaging students in geometric concepts, supporting their learning, and preparing students for mathematics beyond Geometry.

Sam. Sam similarly came from an engineering background, by way of Teach for America (TFA). Though he was an engineer by trade, his long-standing interest in educational issues and

mathematics instruction prompted him to pursue TFA so he could be placed in a school as a secondary mathematics teacher. In his second year of teaching, both of which had been at SHS, Sam was new to the profession, but had been proactive in seeking mentors and collaborators for mathematics instruction. Since starting at SHS, Sam had chosen to teach only Algebra I courses, which made students' performance on the EOC exam a pressing concern for him. He believed his students' EOC exam results would be interpreted as directly related to his instruction.

Sam described his instructional beliefs as oscillating between constructivist pedagogy and direct instruction. Constructivist pedagogy in mathematics involves a teacher-created classroom structure that encourages students to ask questions and become active learners (Simon, 1995), while direct instruction in mathematics involves more structured discussion and practice (Flores & Kaylor, 2007). These two represent starkly different approaches in terms of what students are asked to do, with constructivist approaches giving students room to develop their own understanding, and direct instruction being more intentional in terms of what students are tasked with. While Sam sought to incorporate elements of constructivist education into his classroom, he felt the need to also address gaps in student knowledge through direct demonstration and repetitive practice. In terms of his algebra classroom, Sam focused on exposing his students to different representations of algebraic concepts, and positioning his students to make sense of those different representations. He also acknowledged the prior struggles and knowledge gaps his students entered his classroom with, and made it a point to emphasize their mathematical abilities, and the ways in which their strengths may not have been previously highlighted. Sam's instructional choices reflect his goal of having his students develop as confident mathematics thinkers, and for students to view algebra as a useful tool.

In lesson planning, Sam drew from the district's Glencoe Algebra I textbook, documents

outlining state and district lesson standards, and online repositories where teachers upload their curricular materials. Similar to Minerva, he noted that with a lack of curricular materials that sufficiently address both state and district Algebra I standards, much of the material he used came from colleagues who have been practicing for a number of years. As a novice teacher, Sam was still developing his curricular materials, so much of his came from collaborations with different Algebra I teachers. Sam did note that he enjoyed having discretion over the curricular materials he selected for lessons, though it was difficult with the lack of readily available materials that addressed state and district Algebra I standards. He also acknowledged that as a novice teacher, he was still working to develop a working set of materials that he could employ with students in future years of Algebra I instruction.

For the 2013-14 academic year, Sam had three sessions of Algebra I. Similar to Minerva's classes, Sam had students with a range of prior mathematics experiences. The majority of his students were freshmen who had not previously enrolled in Algebra I, though he also had 10 to 12 students across all three sessions that had previously failed the Algebra I EOC and were retaking the course, most of whom were tenth graders.

In structuring his class, Sam also used purposeful grouping to encourage collaborative work, with groups that he changed frequently. Students were seated in groups of four, and encouraged to draw on one another's knowledge, skills, and abilities during warm-up and practice times, though many of the activities that were observed were structured to be completed independently. During some observed classroom activities, Sam worked his way around the class and sat down at each group table, checking on student progress. Within these groups, he also prompted students to revoice one another and discuss others' problem solving processes. Though students were placed in groups throughout the academic year, there were still opportunities for

students to work individually and silently. Sam’s use of grouping differed from Minerva’s in that Minerva tended to have activities that produced a group product. Based on observations, it seemed that most of Sam’s class activities were designed to allow for individual practice, with students encouraged to draw on group members as resources for support and confirmation.

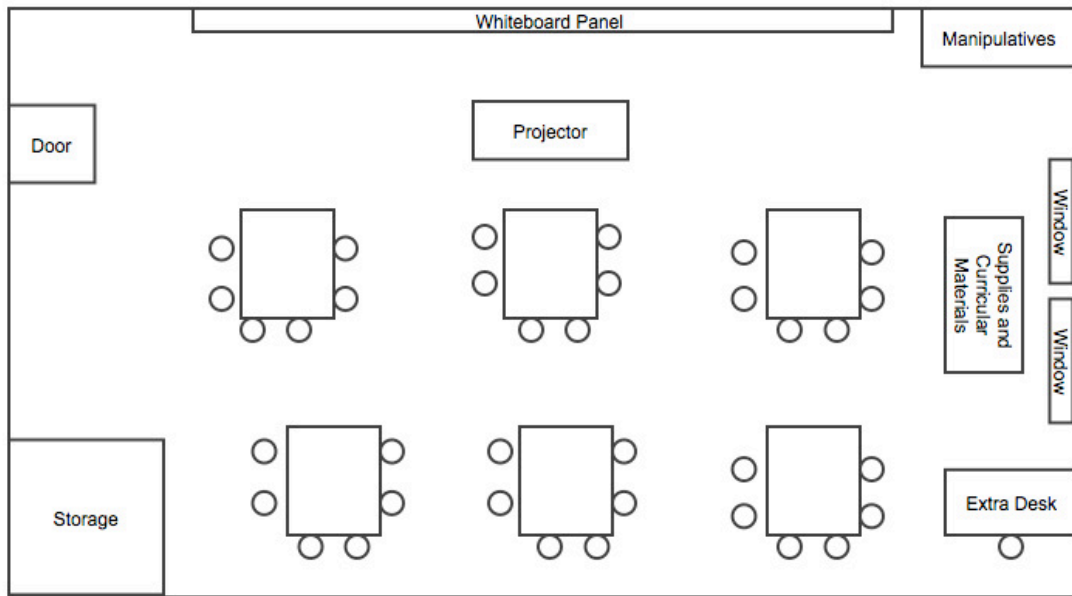


Figure 3. Sam’s classroom layout

During the second semester, Sam distributed an anonymous open-ended survey to his students to learn about their prior mathematics learning experiences, and how they were responding to his class. Sam shared some of his students’ de-identified responses with me. From these responses, it was evident that many of the students had experienced some form of what Sam termed “mathematical trauma” (personal communication, February 2, 2014), which he framed as negative experiences in mathematics learning. In their survey responses, many of his students noted occasions when their mathematics teachers left during the course of the academic year, resulting in instructional inconsistencies. Students also wrote about being placed in lower-tracked classes and being cognizant of their placement with other struggling classmates. Some

shared stories about feeling marginalized within their mathematics classes. This survey ended up being a revealing look into students' mathematics experiences, and provided a great deal of insight into students' perspectives towards the subject.

While his first year of Algebra I classes had given him an idea of the mathematical levels students often enter the course with, Sam was not anticipating the level of dysfunction and negativity his students had experienced in their mathematics learning. In the months leading up to the Algebra I EOC, Sam drew upon his students' survey responses to frame his interactions with the class. Sam also held a family night to talk to students and their families about the Algebra I EOC. At this family night, Sam shared some stories from his anonymous student survey, and some students came up to talk about their experiences firsthand. Sam sought to assure parents that his instructional choices were made with the intent to build student confidence. His purpose was also to collaborate with students, rather than place the onus of passing strictly on students and families. Sam's discussion of student confidence in mathematics was particularly noteworthy, especially within the context of students retaking the Algebra I EOC and/or the course, which will be discussed further in a later chapter, and the role of student confidence and perceptions in their responses to Sam's mathematics instruction.

As a new teacher with solely Algebra I courses, Sam acknowledged that the subject EOC exam was a significant factor in his instructional planning and practice. When discussing his instructional approach, Sam noted, "Finding the best way to prepare my students for the EOC is a fundamental part of my vision and approach to the year" (personal communication, March 6, 2014). Many of the instructional decisions he made were with the Algebra I EOC exam in mind. Describing the EOC exam as an "anchor" (personal communication, June 13, 2014) for him in his practice, he indicated that to him, the test was a way to determine what concepts must be

focused on and what his students should be mastering. For Sam, the EOC could “provide coherence and confidence to me as an educator that I’m teaching what they need” (personal communication, February 4, 2014), demonstrating the way in which the exam and its tested standards acted as a basis for his instructional decisions. In the absence of the EOC exam, Sam would base his instruction around another group of implemented standards. So while he did “teach to the test,” he thought of it in a positive manner, not in the typically negative way it is framed. In discussion about preparing students for the EOC exam, Sam expressed that he was focused on ensuring that students have a “firm conceptual groundwork for all the skills in Algebra” (personal communication, April 1, 2014), which in turn would prepare students to pass. He also appreciated that EOC testing was a mechanism to hold students across the state’s schools accountable to the same academic standards, and could give students some feedback and affirmation about their performances. Sam was upfront about the present role of EOC testing in his practice, and that the exam did influence the instructional decisions he made.

Sam admitted that he had questions about the validity of EOC testing as a measure of student learning. While assessment is a critical component of his classroom, he pointed out the inherent flaws of outcomes assessments, as they may provide a snapshot of student learning, but no measurement can really provide an “exact quantifiable understanding of what a student knows” (personal communication, February 4, 2014). Because student exam performance is contingent on a number of factors, Sam was uncomfortable with the use of a single exam as a precise measure of student understanding. This concern extended to the validity of EOC testing; regarding the Algebra I EOC, Sam expressed, “The EOC is a measurement that tries to be extremely precise and it ends up changing what students learn because I know they have to pass the EOC” (personal communication, February 4, 2014). In his view, the test became more a

measure of teachers' instructional content in preparation for testing, less so of student knowledge. Discussions with Sam appeared to highlight some tension on his part regarding EOC testing, though his concerns regarding testing did not negate focus on preparing students to pass.

Sam also frequently collaborated with teacher colleagues, a few of whom are teachers at different schools. Within SHS, he primarily discussed instructional issues and planned lessons and with some other teachers within his academy. During the 2013-14 academic year, he began collaborating with a fellow Algebra I teacher at a different high school, drawing from her curricular plans and materials, as this teacher had sustained success increasing her students' Algebra I EOC pass rate. Similar to Minerva, because of the division of SHS into academies, his collaboration was primarily with other mathematics teachers within his academy.

The topic of institutional leadership was touched upon in conversations with Sam, but did not come up as often as in conversations with Minerva. During interviews, Minerva discussed leadership more often due to her position as department chair, which necessitate more frequent contact with administrators. Sam did feel that SHS administrators were keenly focused on his students' Algebra I EOC exam performance, and the periodic contact he had with administrators focused on EOC testing and preparation, but not much else.

Though as a novice teacher, Sam was still developing his instructional practice, he did describe strong convictions regarding mathematics that guided his decision-making. As a result of teaching only Algebra I classes, Sam did have a clear focus on structuring his lessons to prepare his students to pass the Algebra I EOC exam. But he was also focused on the prior experiences his students brought with them into his classroom, and encouraging students to recognize their innate mathematical strengths. Sam noted the importance he placed on connecting with students and delving into their learning experiences, as it provided him insights

for how to meet students' various learning needs. Based on conversations and classroom observations, it was apparent that Sam was drawing from different pedagogical perspectives and figuring out what would resonate with his students. While he was still developing his practice, Sam appears to have had a clear purpose in supporting students to pass the Algebra I EOC, in a way that would be responsive to his students and their prior mathematical experiences.

A Look Into Springfield High School

Mirroring the district it is situated within, SHS has had regular change in its leadership structure within the last decade. Minerva explained that prior to Edna become principal during the 2013-14 academic year, the school's previous two principals had been at SHS for only a year each. Edna represented the fourth principal SHS had in the last decade. The instability in leadership during this time was also emblematic of the district, which was about to usher in its third superintendent of this period. There was certainly flux in school and district leadership.

This change in SHS leadership did have a noticeable impact on teacher-administrator relations. Within the context of her position as head of the mathematics department, Minerva reflected on SHS leadership and noted the different approach Edna brought to the position, compared to predecessors: "This is her first year as principal, but she probably has more contact with me than anybody ever has as far as what we're doing in the classroom" (personal communication, February 7, 2014). Minerva had little interaction with prior SHS principals, never mind discussion about instructional issues, so she welcomed the frequent contact with Edna. While Edna did have a particular focus on the school's test performance and graduation rate, Minerva found her attuned to instructional issues, as Edna met often with Minerva to discuss the mathematics courses and teachers' instructional work. Teachers also shared stories of Edna's demonstrative support, from funding teachers to attend conferences, to authorizing the

purchase of mathematics laboratory gear, like the manipulatives Sam was able to purchase for use in his quadratics lessons. Overall though, Minerva noted very little administrative presence in her classrooms; while new teachers may receive visits from administrators, that was not the case for many of the staff. Instead, as department head, Minerva was tasked with observing fellow teachers in their classrooms and operating as an instructional coach, by virtue of her years of mathematics instruction experience and her rapport with colleagues. Still, Edna's increased support for and contact with teachers was a welcome change from the previous SHS principals.

In terms of school structure, both teachers discussed the tracking structure that exists within SHS, as well as the district. Historically, the district, and SHS by extension, has based course placement decisions on students' fifth grade standardized mathematics exam scores. Sam believed this tracking system was implemented based on the intent of selecting courses deemed appropriate for students' mathematical abilities. However, the rigidity of the tracking system did limit students' course options, as it became difficult for students to enroll in the advanced mathematics classes after being placed in the remedial options. While tracking is often a well-intended institutional effort to respond to students' particular learning needs, as appears to be the case at SHS, the use of tracking can also hinder learning opportunities for students when they are assigned to designated low-track courses and not provided with opportunities to move between tracks (Oakes, 2005). While SHS has taken action to restructure mathematics course offerings to meet students' varied learning needs, it remains to be seen how institutional tracking practices might be changed or adjusted to respond to different students.

Regarding EOC mathematics, SHS students' passing rates fall below the state average in both subject exams, which is also the case for the district's other high schools (Washington OSPI Report Card). In response, Minerva expressed belief that the district, and by extension the school,

largely focused on EOC performance in its policies and actions. District-wide, pre-algebra classes were removed from the high schools, so all students entering high school must enroll in Algebra I, unless they had completed the course prior. Minerva pointed out that this was problematic for some students: “We have a lot [of students who] are not algebra-ready and we don’t have any place to put them, unless they’re supported in math in Special Education” (personal communication, January 24, 2014). Students receiving Special Education services received individual diagnoses that guided their mathematics enrollment. All other SHS students who had not yet completed Algebra I were required to enroll in their freshman year, regardless of readiness. Though placing all high school students in Algebra I may be well-intentioned, in practice, it was difficult for students who entered SHS unprepared for Algebra I because there were no other curricular options. While the district’s policy fits with the “algebra for everyone” approach (Liang et al., 2012, p. 329) that has increasingly been adopted as part of education policy, this approach may actually be detrimental to students who are not prepared to take Algebra I, particularly in schools lacking structure to support students (Liang et al., 2012). Placing all students in Algebra I, regardless of their preparation level and prior math experiences, has had mixed impact on student learning outcomes, and in concert with the elimination of pre-algebra, limited students’ curricular options. The district’s policy towards Algebra I as the lowest mathematics course offering ought to re-examine whether or not it is actually beneficial to students and their progression through secondary mathematics.

As a result of the elimination of pre-algebra classes, Minerva noted that Algebra I classes at SHS tended to have the highest enrollment. As department head, Minerva had worked with SHS administration to cap enrollment in the Algebra I classes at 25, but this had been difficult as it was contingent on teacher availability and personnel funding. Minerva was a staunch believer

in reducing course sizes, as she felt it would enable teachers to spend more time working one-on-one with students. From her time teaching Algebra I at SHS, Minerva recalled that her classes had at least 30 students, which often limited the individual time she had to check students' work and talk to them about their understanding. Knowing the foundational importance of Algebra I understanding, Minerva wanted the classes to have smaller enrollment numbers, hoping that a class capped at 25 students would allow SHS teachers to have one-on-one time with students.

Regarding Algebra I courses at SHS, Minerva also expressed concern with the tendency to assign novice teachers to the Algebra I classes. She did not express doubts about novice teachers' and their efficacy as instructors, but questioned SHS's practice of placing novice teachers in Algebra I classrooms with large student enrollment numbers. Minerva was particularly concerned with the attention administrators directed towards students' Algebra I EOC performance, and consequently how Algebra I teachers were being focused on. She was particularly concerned about ensuring that novice teachers had sufficient instructional supports for their Algebra I classes. As department chair, she did devote time to observing the Algebra I classes and meeting with teachers to debrief about their classroom practice. However, with the assignment of the Geometry support course, Minerva found her observation time reduced and she had less time to debrief with colleagues. For novice teachers in particular, Minerva wanted more time to work closely with these teachers, but found it difficult given the additions to her schedule. Minerva was concerned with the propensity to assign novice teachers to the Algebra I classes, as these were full classes that attracted administrative attention, and due to her increasingly limited ability to observe and work closely with these teachers.

Though the SHS mathematics department had made it a priority to reduce the class enrollment of its Algebra I courses, this was contingent on having a sufficient number of teachers

available for these courses, and staffing issues were subject to institutional approval and action. Minerva alone was unable to make staffing decisions for the mathematics department. When Minerva lobbied SHS administrators to hire more Algebra I teachers, she was told her request would have to wait because the school needed to allocate funds to hire teachers in the other departments. By the end of the data collection period, SHS had not hired additional teachers for its Algebra I courses, so the question remains as to how SHS and its mathematics department will move forward in efforts to reduce the student enrollment in its Algebra I classes.

In response to student issues in mathematics, SHS instituted a mathematics lab after school, as an opportunity for students to receive homework assistance and additional support from teachers. Each academy within SHS offered support time twice a week, providing students with time to complete homework and obtain direct assistance from teachers, who all took turns staffing the lab. The course offerings were also been restructured for the 2014-15 academic year, specifically to address Algebra I performance. SHS will offer integrated course options: a two-year mathematics option that combines eighth grade math, Algebra I, and Geometry concepts, as well as a one-year course that blends Algebra I and Geometry. According to Minerva, the purpose of having these integrated courses is to support students who have exhibited difficulty in Algebra I. With this option, students could avoid retaking Algebra I and instead stay on pace to enroll in Algebra II as juniors. These options may also support SHS efforts to keep the Algebra I course enrollments below 25 students. Many of the efforts SHS has undertaken concerning mathematics has focused on structural initiatives, such as restructuring course offerings or adding study time, but less so on instructional issues or supports, which could improve the learning processes that occur in the classroom. It remains to be seen how these structural reforms will impact students, and how effective they might be in encouraging student improvement.

Institutional Focus on EOC Testing

Considering the relatively low pass rate of SHS students on the Algebra I EOC (for the 2013-14 year, 25.7% of all SHS students met standard), it was not at all surprising that SHS administrators would be acutely focused on improving student performance on this exam. Both Minerva and Sam expressed awareness of judgments meted out based upon EOC performance, not only for themselves, but also for the school itself. The institutional focus on Algebra I EOC performance, which Minerva noted stems from the district, led Minerva to believe that school resources were being focused on the Algebra I courses above the other mathematics courses. Consequently, Minerva asserted that due to overt focus on Algebra I EOC performance, the other mathematics courses were marginalized, including Geometry, even though it also has an EOC exam attached to it. Minerva noted this focus may be the product of public scrutiny, particularly with district Algebra I EOC pass rates lagging behind state average, and focus on keeping students on track and on pace to enroll in Calculus by their final year.

For the 2013-14 academic year, SHS administrators created a list containing the names of students who had not yet passed the Algebra I EOC. This list was then disseminated to mathematics teachers, with instructions for teachers to pay particular attention to these students. As the year progressed, students who exhibited difficulty in class were added to this list. Students on this list were pulled out individually by administrators to have conversations about the importance of the EOC exams. Neither teacher expressed that the list had been particularly beneficial for students who appeared on this list, as there was little action by administrators past a conversation with listed students, and the list did not factor -- for either teacher -- as an element of their instructional decision-making process. Additionally, Minerva noted discomfort with the idea of having this list and how it characterized students as struggling. Sam shared similar

sentiments, and was concerned that students were being singled out for their difficulties for teachers and fellow students to see. While this indicates that administrators were devoting attention to struggling students, it also indicates that this action alone was an insufficient way to support and encourage students in their efforts to pass EOC exams.

Additionally, this focus on improving Algebra I EOC pass rates had interfered with instruction on at least one occasion. With the Algebra I EOC retake approaching in spring 2014, SHS administrators asked Minerva to review algebraic concepts in lieu of her Geometry instruction. Minerva declined to do so, as she did not feel it would be prudent to take time away from Geometry to review Algebra I, particularly with the instructional pacing schedule she had set up. At SHS, students who did not pass the Algebra I EOC were not automatically placed in Algebra I the following year. Course placement was contingent on individual teacher assessment of students. When looking at his Algebra I students who did not pass the EOC, Sam based his course recommendations on students' second semester course performance. Of students who did not pass the Algebra I EOC, some were placed in Algebra I in hopes that another year would bolster student understanding of the subject, while other students were deemed ready to move on to Geometry. Though moving students ahead despite difficulty with EOC testing might have bolstered students' confidence in mathematics, it did present a conundrum when students spent a year in Geometry class, but had to simultaneously be prepared to pass an Algebra I EOC retake. SHS was still looking for a way to effectively support students who fell into this category.

To address students who were struggling in Geometry, a support class was created in the second semester of the 2013-14 academic year. Students identified by SHS administrators as needing additional instructional time were placed in an elective class, designed to provide additional Geometry instruction and homework support. At the onset, there were teacher staffing

issues. Initially, Minerva was the only Geometry teacher leading the support class, but two additional Geometry teachers came onboard later in the semester, which facilitated more one-on-one instructional support time for students. In this support class, students were given time to work on course work or homework. The support class also provided opportunity for students to review concepts and to receive targeted learning support from teachers. Students were not enrolled voluntarily but based on SHS administrators selection of students who had low scores in their Geometry classes. Minerva explained that the rationale behind the Geometry support course was to provide additional classroom time to students exhibiting difficulty in Geometry.

Minerva did note that student responses to being in the Geometry support class were wildly varied and affected their participation. Based on an observation of the Geometry support class, I noticed some students were visibly disinterested and detached, while others made concerted efforts to engage in classwork. Minerva found that participation did improve with more teachers in the support class to provide additional attention to individual students. Upon reflection, Minerva noted that the support class was effective for the majority of enrolled students, but the unorganized way the course was implemented likely limited its efficacy. Additionally, for a small group of students, enrollment in the Geometry support class still did not address their learning issues. As with the other SHS initiatives, it is not certain how effective the support class might be in address learning needs and encouraging academic improvement.

Reflecting the institution's overall approach to mathematics, SHS initiatives regarding EOC testing were largely focused on personnel and structure, primarily identification of students who were struggling and placing them in a course for additional Geometry instruction and support. Regarding SHS initiatives for EOC testing, Sam noted, "I think that as a school, we are just addressing these needs at very surface levels" (personal communication, February 4, 2014).

None of these initiatives were focused on instructional practice or teacher learning, or deeper issues that impact student performance. The actions pursued by SHS may be in line with what City et al. (2009) identified in their research as efforts that are external to the instructional core. While these external efforts impacted the context and environment in which the learning process occurs, they did not impact the in-class interactions that affect learning quality and opportunities, including the interactions between teachers and students (City et al., 2009). External initiatives are easier to implement precisely because they do not impact the intricate interactions of learning processes in the classroom, but are unlikely to have the intended improvement on student learning outcomes (City et al., 2009). However, the initiatives pursued at SHS are in line with what Perna and Thomas (2009) found in their study of high schools allocating resources specifically towards test preparation and passing, rather than towards instructional improvement. It is far too soon to draw broad conclusions about the efficacy of SHS initiatives in mathematics or those focused on EOC testing, but because these initiatives do not impact the instructional core, it is questionable how much of a positive impact they might have on student learning outcomes, or on students' performance on the EOC mathematics exams.

Impact of End of Course Testing on Instructional Decisions

Examining the Zone of Enactment Regarding EOC Testing

Based on the facets outlined by Spillane (1999), the components of the zone of enactment⁸ are discussed in this chapter, looking at each teacher individually. Examination of the interactions between capacity, will, prior practice, learning opportunities, and incentives provides insight into factors that influence how these teachers interpreted, processed, and incorporated EOC testing policy into their instructional practices. Study of each teacher's zone of enactment can also elucidate the reasons for similarities and variations in these teachers' responses. This section also includes discussion of the specific ways in which EOC testing ended up influencing teachers' instructional decisions regarding content and pacing.

Spillane's (1999) article studied teachers' instructional responses to state reforms around mathematics instruction. Spillane posited that examination of a teacher's zone of enactment can be illustrative in understanding how teachers might change their core instructional processes to be consistent with reforms. Additionally, it supports understanding of how teachers can develop different interpretations of the exact same reform. For this study, the purpose of drawing from Spillane's zone of enactment work is to understand how these two teachers processed and responded to EOC testing policy, and how individual and contextual influences might have impacted and influenced their responses.

Spillane (1999) conceptualized capacity as a teacher's ability to practice in the ways recommended by reformers. In examining Minerva and Sam's individual zone of enactment regarding EOC testing policy, *capacity* in this study is characterized as the ability to teach according to the EOC-tested learning standards set forth by the state. Spillane described *will* as

⁸ See Conceptual Framework for description of zone of enactment.

the motivation to change practice to carry out reformers' recommendations. For the purposes of this analysis, will is discussed as teacher *motivation* to make instructional decisions that reflect EOC testing considerations, including those concerning curricular content. As part of examining the zone of enactment, teachers' *prior instructional practices* will also be discussed. Focus on learning opportunities concerns those that were specifically focused on disseminating information about EOC testing. In this study, incentives for learning about EOC testing policy were not present, so analysis focused on the learning opportunities and supports provided for teachers to learn about the exam and its learning standards. While EOC testing policy is not one where teachers can elect to opt-in or –out, as their students are subject to meeting state testing requirements, the level of buy-in and prioritization can vary. In utilizing Spillane's (1999) zone of enactment to understand these teachers' responses to EOC testing policy, the goal is to examine how teachers' resources, external incentives, and learning opportunities intertwined and influenced their individual responses, and manifested in their instructional decisions.

Minerva. Having been through multiple iterations and changes to the state's testing system, she was keenly aware of the process, purpose, and use of high-stakes testing policy, and what the expected outcomes of testing are. While she expressed that high-stakes testing was not her ultimate priority as a mathematics teacher, she also acknowledged the public scrutiny and attention students' testing performance receives, and the way it reflects upon the institution and individual teachers. As such, she incorporated EOC testing considerations into her practice and ensured that her instructional content decisions were aligned with the tested standards of the Geometry EOC exam, supporting students' efforts to pass.

EOC testing policy primarily impacts the curricular content of tested classrooms; Minerva noted that state mathematics standards were implemented with no prescription from the

state in terms of how curriculum was to be taught. Curricular content is one of the core considerations of instructional practice, highlighting the impact high-stakes testing policy can have on teachers' instructional decisions (Darling-Hammond & Rustique-Forrester, 2005). Minerva had the capacity to adjust her curricular content to align with state Geometry standards, with focus on those that would be tested on the subject EOC exam. Her instruction already reflected a standards-based approach, as this was characteristic of SHS and the district. In her planning, she explained that she normally built her lessons on district and state learning standards. For one of the lessons I observed, Minerva had developed her lesson plan around determining triangle congruence, which is designated as an EOC-tested standard. Another lesson covered the characteristics of quadrilaterals, another EOC standard that students would need to master. Developing curricular material that aligned with Geometry EOC-tested learning standards was not an issue, and she based her lessons on those designated standards, though she did discuss wanting to have more EOC-specific curricular materials available to her.

In her lesson planning, Minerva drew from the state's *Crosswalk* documents, which delineates the state's mathematics course standards as either green or yellow, green indicating a standard that will appear on the EOC exam, and yellow indicating a standard that is less likely to appear. Minerva expressed some disagreement with the designations of standards – for example, circles are designated yellow in the Crosswalks, even though she identified circles as a key component of geometric mastery and understanding. Though the state does not explicitly state that yellow standards are less critical or less prioritized, Minerva felt that the Crosswalk documents insinuated which standards should take precedence in instruction. During discussions regarding the influence of EOC testing policy on her instruction, Minerva noted that she structured lessons to be aligned with EOC-tested standards, but that the presence of the exam did

not change or alter her stance on active learning and conceptual understanding. Rather, the impact of EOC testing was primarily in terms of curricular content. Minerva had capacity to use EOC testing and state learning standards as the curricular basis for her instructional decisions.

While Minerva clearly had the capacity to ensure her curricular decisions reflected EOC-tested standards, there seemed to be an undercurrent of resistance to EOC testing in her motivation to embrace EOC testing. She incorporated elements of test preparation into her instructional decisions because she knew the implications and potential consequences were crucial for her students and the institution, but not because she wholeheartedly supported the utilization of EOC testing. During a discussion about EOC testing, she questioned its efficacy in capturing student knowledge, stating, “I don’t think it’s a good measure of what a kid knows and what he can do” (personal communication, January 24, 2014). She felt that the Geometry EOC exam only represented one data point at one moment in the academic year, which alone could not wholly capture the extent of student understanding. Though Minerva was not a staunch supporter of EOC testing, her will to incorporate testing considerations into her instructional practice was not adversely impacted. She based lesson content on tested standards to prepare students to pass the Geometry EOC exam, and sought to assure students that the lesson content of her class was aligned with the EOC exam. During a lesson on radicals, Minerva informed her students that radicals would appear on the Geometry EOC exam, and urged them to simplify their work, as the correct exam response would be in the most simplified form. But it did seem that she was not a deep believer in the use of EOC testing as a gauge of student knowledge and understanding, or as part of secondary graduation requirements. The motivation to make changes to her curricular content appeared to stem from a desire to ensure students pass the exam, not from belief in the efficacy or the value of the EOC testing system itself.

More concerning might be the further impact of constant change on her motivation to buy in to future policy reforms. While Minerva is unlikely to marginalize policy edicts, as she is well aware of the critical implications for school actors and students, it did appear that the constant change in state policies and actions had adversely impacted her motivation to embrace future policy changes. Minerva lamented the constant changes in state standards and test format, as she felt it precluded her from building and refining her instructional modules. With yet another major change in state standards and testing ahead of her, Minerva noted her feeling of “wait and see” (personal communication, September 8, 2014), expecting the CCSS and Smarter Balanced assessments to be subject to further change in the future. Based on interviews and classroom observations, Minerva had the capacity and motivation to adjust her practice to reflect state EOC-tested standards, but she did not heavily invest in these initiatives or change her instructional philosophy in part because she was expecting these changes to be short-lived. While Minerva does not marginalize or ignore policy changes, it did seem that her will to make substantial changes to her practice based on every new policy is tenuous.

Minerva’s prior experiences, both as a learner and as a teacher, also factored heavily into her zone of enactment. During discussions about her instructional beliefs and practices, she frequently referenced her engineering background and the active mathematics learning that she found most beneficial in preparation for an engineering career. Based on her own positive learning experiences, she placed a premium on active learning opportunities, encouraging students to work with mathematics manipulatives and collaborate with peers. She also recalled that students had responded positively to her lessons when they were tasked with engaging in problems that drew upon their interests. Minerva explained that based on her prior students’ positive reaction, she continued to draw upon her students interests in her lessons, as evidenced

by an activity on scale modeling that stemmed from a student's hobby of making model airplanes. Referencing her prior learning and teaching experiences, Minerva's instructional decisions incorporated active learning and student interest considerations to engage students.

Her experiences with the state's previous forms of standardized testing also tempered how she viewed the relationship between her instructional decisions and EOC testing. Minerva explained that at the start of her teaching career, her main focus was students' conceptual understanding and mastery, with little attention devoted specifically to testing:

When I first started teaching, I never prepped my kids for end of course. I just wanted to teach them really great math. I had really great results with it. I wanted to do that start over thing, just go in and teach really great math. In fact, my first two years I refuse to even review for EOC or prep my kids at all for EOC. I had some of the highest scores in the district. I want them to learn this, but learn it great. They did. I need to get back to that (personal communication, June 16, 2014).

She noted a shift from her previous instructional approach, where the state's standardized exams did not take priority in her instruction, and instead focused on engaging students in deep mathematics learning. Minerva described a relenting desire to go back to that manner of instruction, where the focus would be on conceptual learning rather than test preparation. On multiple occasions, Minerva reiterated her instructional purpose was to encourage student learning and prepare students to progress to higher mathematics courses. But she also noted that with her taking on the role of mathematics department head, and with the increasing public focus on students' standardized test performance, focus on EOC test preparation became imperative. Administrators, parents, and the public increasingly gauged her efficacy as a teacher based on her students' EOC exam pass rate, determining how efficient her instructional practice was in preparing students to pass. While she continued to incorporate considerations for active learning and conceptual understanding into her instructional decisions, the EOC-tested standards came to be the basis for curricular content. Additionally, she worked to ensure that class problems

reflected the format students would see on the Geometry EOC exam to prepare them for the logistics of the exam. Still, Minerva seemed eager to return to her prior practice of minimizing the role of standardized testing in her instruction. In concert with the other facets of her zone of enactment, Minerva's underlying resistance towards EOC testing was apparent. While her prior experiences did not preclude her from incorporating EOC testing in her instructional decisions, her discussions indicated a desire to return to instructional decisions that are based on active learning and conceptual mastery, rather than EOC testing considerations.

In terms of learning opportunities regarding EOC testing policy, Minerva recalled few coming from the state or district. For the 2013-14 academic year, she did not recall learning opportunities or resources presented as incentives, either from the state, district, or institution, to encourage adoption of EOC-tested standards or considerations. Instead, Minerva recalled that learning opportunities primarily focused on the state's impending transition to CCSS and Smarter Balanced assessments. The district in particular focused on creating instructional modules for its mathematics courses to be used in the CCSS transition, as well as a module map showing the alignment of CCSS from preschool to twelfth grade. None of these professional learning opportunities focused specifically on EOC testing, or on supports for students retaking EOC exams. Beyond use of the Washington OSPI website and state standards documents, there was little information or oversight from the state in regards to how EOC testing might fit into curricular decisions. At the institutional level, Minerva did receive some support from the school's testing coordinator, but she primarily obtained information and support for EOC testing from her academy colleagues. Much of the information and support Minerva received regarding EOC testing came from informal sources, rather than from professional learning opportunities. While the lack of professional learning opportunities did not preclude Minerva from

implementing and incorporating EOC testing policy into her practice, there was a lack of opportunities for Minerva to engage deeply with the policy and wrestle with her instructional beliefs in the context of this new policy (Cohen & Hill, 2001), which might have supported understanding of how to align curricular content decisions with the Geometry EOC exam. The lack of resources around EOC testing and retakers might also be considered in examining Minerva's instructional responses and decisions, considering the scant instructional support that was provided at the state and district levels regarding testing.

During discussion about EOC testing policy, Minerva was critical of what she perceived as necessary compliance, as she had to adhere to EOC testing policy because of the potential adverse consequences for her students, and because of the focus placed on EOC testing outcomes. Minerva expressed belief that SHS administrators would use her students' EOC results as a gauge of her efficacy, both as a teacher and as mathematics department head. In previous years, Minerva noted that SHS administrators had come directly to her to express disappointment with the school's performance on all mathematics EOC exams, as a proxy for all department teachers. Knowing that evaluation of her performance would be heavily contingent on how SHS students scored on the EOC exams, testing served as an incentive, but as an incentive not to run afoul of administrators, and to not be castigated as an ineffective teacher and department head: "I'm still being judged on [test results]. I still have administrators down my throat constantly. How are they going to pass this test? How are they doing? How are they doing? Are they going to pass this test? It's all about this stupid test" (personal communication, June 16, 2014). While administrative pressure does not fall under the examples of external incentive described by Spillane (1999), I highlighted this example of administrative pressure to prioritize EOC testing within the classroom, and the manner by which EOC testing impacted Minerva's interactions

with SHS administrators. Minerva's conversations with school administrators largely focused on EOC exam preparation and performance, with discussion of little else. Her experiences also raise questions about how other teachers within the SHS mathematics department interact with administrators, and other teachers' perspectives regarding SHS administrators' focus on EOC testing. Fellow SHS mathematics teachers may also be grappling with similar administrative pressures to focus on EOC testing, so it bears questioning how teachers were responding to administrators, and how motivating EOC focus might have been for them in their instructional decision-making. For Minerva, administrative focus on EOC testing did not act as an incentive for her to learn deeply about EOC testing, though it did prompt focus on the exam as a core facet of instructional decisions. However, she did not view this influence as a positive, and remained critical of the manner in which EOC test performance was wielded as a measure of her efficacy as a teacher and department head.

Examining the different aspects of Minerva's zone of enactment, there is a sense that while she enacted EOC testing policy in its intended manner, she complied with the testing rather than completely buying-in to EOC testing. While her curricular content decisions were made in line with EOC-tested content, Minerva did so in effort to support students to pass the exam, not because she personally believed the exam should take precedence in her instructional practice. During discussions of her perspective on EOC testing policy, Minerva often referred to her prior experiences with state standardized testing and the continual changes regarding test format and tested standards. As a result of multiple changes, Minerva seemed to regard policy changes as temporary, which she found obstructive in efforts to refine her curricular materials. In response to EOC testing policy, it seems that she drew more from her learning experiences and her prior practice, focusing on the pedagogical practices that had resonated with past students and showed

promise, and adjusting curricular content to align with the tested standards. Minerva's interpretation of EOC testing policy appears to be focused on supporting students to pass the EOC: "I mean when you teach an EOC class, what you do is EOC policy, you know, as far as policy is get all your kids to pass, it's, I mean that's, that's like the only rule there is" (personal communication, March 31, 2014). Enactment of EOC testing policy in Minerva's practice reflected the content prioritized by the state exam, and manifested in the curricular decisions she made for her Geometry classroom, but was done so out of acknowledged importance of EOC exam performance, and not because she valued the testing system.

Sam. Though Sam was relatively new to the teaching profession, he was well informed about testing and its role and application in public education. Prior to leaving the engineering field to become a mathematics teacher, Sam had a strong interest in educational reform issues. While he did not have experience teaching under the state's prior iterations of high-stakes testing, he entered the classroom knowing that EOC testing would be a pressing issue at SHS. To that end, he sought information about the exams from colleagues and from the Washington OSPI site. In discussions about his instructional decision-making process, he noted that EOC-tested standards were a focal point of his curricular decisions, with careful attention to which standards would be emphasized on the Algebra I EOC exam and what students would need to learn to demonstrate mastery of these standards. Sam had the capacity to align his curricular content decisions with the state's Algebra I standards, and the capacity to focus his instruction on the learning standards that students would be tested on the EOC exam.

Despite some misgivings about high-stakes testing, Sam readily made EOC testing a focal point in his instructional decision-making, demonstrating a high measure of will to ensure his instruction fit with the content composition of the Algebra I EOC exam. Understanding the

history of low pass rates of SHS students on the state's mathematics high-stakes exams, Sam came in knowing that his students' EOC performance would be under scrutiny, both from the school and from parents. With the understanding of the implications that Algebra I EOC has for students' graduation prospects, Sam came in with strong will to figure out how to account for EOC testing policy in his instruction. Though he stated that his main instructional goal was for students to develop conceptual understanding of Algebra I, determining how to give his students the best opportunity to pass the Algebra I EOC exam was also a major facet of his instructional decision-making. In his responses, Sam was candid about the priority he placed on EOC testing and preparation within the context of what he considered effective mathematics instruction.

Sam did clarify that his focus on EOC testing was not blind support of EOC testing policy or of high-stakes testing in general. He expressed concern about the validity of testing as a practice, citing the Heisenberg Uncertainty Principle⁹ in his unease with how the construction of a tool can alter the very property it seeks to measure; he questioned the reliability of EOC testing as a measure of students' understanding, and the suitability of including EOC results as part of state graduation requirements. However, concerns regarding EOC testing did not adversely impact his motivation to understand and incorporate EOC testing considerations into his instructional decisions. In spite of his misgivings about high-stakes testing, he viewed EOC preparation as a central responsibility in his instructional decision-making:

I mean despite what I think about the test, at the end of the day, I'm very pragmatic about realizing that this is what my students need to do. And so teaching to the test has such a negative connotation, and I don't mean to say that I'm just putting problems up and having them do it, but in a sense I am teaching to the test. I'm, that's my metric at the end of the day. If I'm confused about what to teach, what not to teach, how to teach it,

⁹ According to McKerrow and McKerrow (1991), the Heisenberg Uncertainty Principle outlines that the use of an instrument inherently affects measurement, as "the process of *observing* affects what is observed." Sam expressed that designing a test to measure or capture student knowledge would end up impacting the content that is taught, as it would lead to teachers focusing on student performance on the concepts that test designers want to measure. A test becomes more of a measure of what was taught than what students know.

I'm going to defer to asking myself the question if I teach it this way, is it going to help my students pass the EOC? (personal communication, February 4, 2014).

Even with lingering concerns about EOC testing and its role in secondary graduation requirements, Sam viewed EOC testing considerations as a central facet of his instructional decision, which were made with the goal of supporting his students to pass the Algebra I EOC exam. Knowing that success on the EOC exams was central to his students' academic progression and graduation prospects, his overarching focus was to support students to pass the Algebra I EOC exam, and he made exam preparation a prominent feature of his instructional decision-making. Sam was amenable in regards to his motivation to learn about and incorporate EOC testing policy into his instructional practice. Testing concerns aside, Sam focused on the effect EOC performance would have on his students' academic progression, and the prior performance trends within SHS and the district, and as a result, readily incorporated EOC testing standards considerations into his instructional decision-making.

Like Minerva, he drew upon the Crosswalk documents and prioritized the green standards that would appear on the Algebra I EOC exam. While his instructional practice was focused on EOC testing from the start of the academic year, Sam found that as the year progressed, his lesson planning became increasingly structured around the exam, aligned specifically to the green standards. In his lessons, he drew connections between class material and the EOC-tested standards, hoping to assuage students that what they were learning would prepare them to pass the exam. Sam also found that certain existing Washington State Algebra I learning standards were not emphasized on the Crosswalk documents, which he felt presented "conflicted messaging" (personal communication, February 4, 2014) about what the state prioritized in student learning and mastery of Algebra I. Quadratics (Standard A1.5.) is designated a yellow standard on the Crosswalk documents, which Sam found puzzling as he

viewed quadratics as a necessary concept in algebraic learning. He was so concerned about his students' understanding of quadratics, he used a district grant to purchase algebra manipulatives for working with quadratic formulas and solutions. He expressed that the algebra manipulatives provided a visual tool for students who had experienced prior trouble with the concept, which he wanted to correct so students could apply quadratics in subsequent mathematics courses. Sam also found the implicit signaling of yellow standards perplexing, as it indicated to him that certain standards were supposed to be taught for mastery, even though students would not be assessed on them. In practical terms, he prioritized the green standards that would be on the Algebra I EOC exam and fit in the yellow standards as time permitted. Throughout our conversations, Sam made it clear that the Algebra I EOC exam played a central role in his instructional decisions. Regarding the Algebra I EOC and its impact on his instructional decision-making, Sam commented, "I change my pedagogy in the classroom, I change the way that I approach things, I change the way that I motivate kids" (personal communication, February 4, 2014). Many of the instructional decisions Sam made and enacted in his classroom were made with the Algebra I EOC exam in mind. The presence of EOC testing did indeed motivate Sam's instructional decisions, impacting the content, activity, and pedagogical choices he made.

In discussions about his prior practice, Sam often referred back to his first year of teaching Algebra I at SHS and his feelings of uncertainty about his instructional practice. Being a first year teacher and new to SHS, Sam did not feel completely confident that his instruction and assessments practices were sufficiently aligned with the Algebra I EOC exam. In response, those feelings of uncertainty prompted Sam to increasingly tie his instructional decisions to the exam, and to make those connections explicit to students. For the 2013-14 academic year, Sam partnered with a senior mathematics teacher, Liz, who taught Algebra I at a high school in a

different Washington State district. Liz's students and her school at large had success at steadily increasing EOC mathematics exam pass rates over the past four years. Liz shared her curricular materials with Sam, who adapted these materials to fit with his pacing and sequencing schedule. He also told his students about his collaboration with Liz to assure them that he was making instructional decisions geared to best prepare them to be successful on the Algebra I EOC exam. Coming into the 2013-14 academic year, Sam's perceived deficiencies from his first year of instruction prompted him to increasingly incorporate EOC testing as a consideration in instructional decisions, and rethink his curriculum to best support students to pass the exam.

Similar to Minerva, Sam recalled few learning opportunities in regards to learning about and incorporating EOC testing policy into instructional practice. State and district learning standards documents were helpful in understanding what content to emphasize and focus on. Sam accessed the Washington State OSPI web site on different occasions, but he did not find the information particularly useful in terms of everyday instructional decisions. At the building level, Sam did not recall any learning opportunities present to encourage learning and processing of EOC testing policy. As members of the same mathematics department, Minerva and Sam attended many of the same district- and school-level professional learning opportunities, none of which focused specifically on EOC testing. However, the structure of SHS placed Minerva and Sam in different academies, which resulted in variations in the peers with whom they collaborated and received information from. In the 2013-14 academic year, SHS began the process of implementing and enacting professional learning communities (PLCs) as a resource for professional learning, allowing teachers to collaborate in structured meetings. However, the PLCs did not focus on EOC testing considerations or on the testing policy itself. In his recollections, there were few formal learning opportunities about EOC testing: "everything that

we've had to learn about it has been through our own experience or through information passed down from people in our district, or from finding out the information on our own through OSPI" (personal communication, February 4, 2014). In the absence of formal communication and information about EOC testing, Sam had to seek it on his own. Like Minerva, Sam did not recall district or institutional professional learning opportunities that were particularly supportive in regards to EOC testing policy or the implications of EOC testing for his instruction.

Based on his responses, Sam's zone of enactment appears to have led him to be amenable to EOC testing policy, both in terms of learning about the policy and then figuring out how to enact it within the classroom. Though he had some reservations about the use of high-stakes testing as a measure of student knowledge, he demonstrated the will and capacity to learn about EOC testing policy, and to figure out how his content decisions would reflect EOC-tested standards. Preparing students for the Algebra I EOC exam became a focal point of Sam's instructional decision-making. Sam's response to EOC testing policy does appear to be fairly different from that of Minerva, who expressed more exasperation with the policy change.

While both teachers incorporated EOC testing considerations into their instructional decisions, and focused specifically on how to effectively prepare students to pass the subject exams, there was a stronger undercurrent of resistance in Minerva's responses. The impact of prior practice, tied to years of experience, may be a factor in considering how Minerva and Sam differed in perception and response to EOC testing policy. Minerva's teaching career has seen multiple changes to learning standards and test formats, with further major changes pending. Sam is at the onset of his teaching practice and is still tinkering and refining his instructional materials and pedagogical practice. With additional years of practice, he may develop a firmer sense of what he wants his instruction to cover, and his perspectives on instruction and best

practices are liable to change. Also, Minerva's position as department chair seems to also contribute to her resistance, as she has been the main recipient of SHS administrators' displeasure regarding the school's EOC mathematics exam results, and she has been tasked with finding ways to improve the school's performance. Given the differences in their zones of enactment, the differences in Minerva and Sam's responses were expected, considering Minerva's years of teaching experience and duties as department chair. However, more study is needed to understand these differing responses, as there are other personal and contextual factors that could be influencing their relative acceptance of EOC testing policy.

Compliance with EOC testing policy was not an issue with either teacher, but based on Minerva's responses, engendering support from teachers for the implementation education policies may be difficult with further instability in their teaching contexts. In future education policy efforts, examination of teachers' zones of enactment may reveal differences in capacity, will, prior practice, incentives, and learning opportunities that influence the way teachers interpret and enact policies at the classroom level. In Minerva's case, it appears that her prior practice experiences have negatively influenced her will to internalize EOC testing policy, as she viewed EOC testing as yet another initiative subject to change. Her prior practice and instructional beliefs contributed to a lower level of motivation to change in accordance with EOC testing policy, compared to Sam. As Sam progresses in his teaching career, it remains to be seen how his zone of enactment will change, and how these changes will color the way he views and implements future education policies. It bears considering how inconsistencies in policy decisions may impact teachers' perceptions and responses to these efforts.

Closer Examination of Curricular Content Decisions

Minerva and Sam differed in the way each discussed how EOC testing impacted their

instruction—while Sam freely admitted that he taught to the test, Minerva had a mixed response regarding its instructional influence. While she noted that “it affects what I teach and at what level my kids learn it” (personal communication, January 24, 2014), she also stated that she preferred to focus on standards-based and active learning instructional decisions, through which students would ultimately be prepared for standardized exams. This seemed to underscore variations in how teachers’ instructional practice is impacted by high-stakes testing policy (Diamond, 2007; 2012). While EOC testing did impact both teachers’ instructional decisions, the extent to which it was a factor differed according to their responses, which appears to have been influenced by the context and interactions within their individual zones of enactment.

Both teachers also discussed consideration for the format and structure of EOC questions, though the state does not allow teachers to see copies of the exam. After talking to her students after EOC administration, Minerva realized the way she structured her class problems differed from that of the Geometry EOC exam, which led her to believe that some of her students might have passed the exam had it been structured or worded differently. In her estimation, some students who had failed did have the knowledge and understanding to pass the Geometry EOC exam, but might have been tripped up by an unfamiliar question format. During one class observation, Minerva was working with students on radical numbers as part of trigonometry. Asking students to find the square roots of 50 and 80, she implored her students to be cognizant of simplifying their answers, as the correct Geometry EOC exam answer would be in the solution’s most simplified form. Sam also referenced Algebra I EOC exam structure in his courses, deliberately presenting classwork problems that would be similar to those on the test itself. For one review section, Sam presented students with absolute value graphing problems structured on the EOC exam format. In both classes, while the EOC exam was not an overt

discussion point for either teacher, students did ask questions about how the EOC exam might be structured, which appeared to reiterate the necessity of discussing EOC format and structure during class time. The format and structure of the mathematics EOC exams were on both teachers' minds and became reflected in their instructional decisions.

Both teachers based their curricular content decisions on Washington mathematics learning standards

Both teachers prioritized green EOC-tested standards in their instructional decisions

What both teachers discussed about the effect of EOC testing on their instructional

content decisions mirrors Jennings and Bearak's (2014) discussions of "content-based forms of teaching to the test" (p. 382). The figure below is taken from their 2014 article examining the specific ways teachers adjust their instructional practice in response to high-stakes exams:

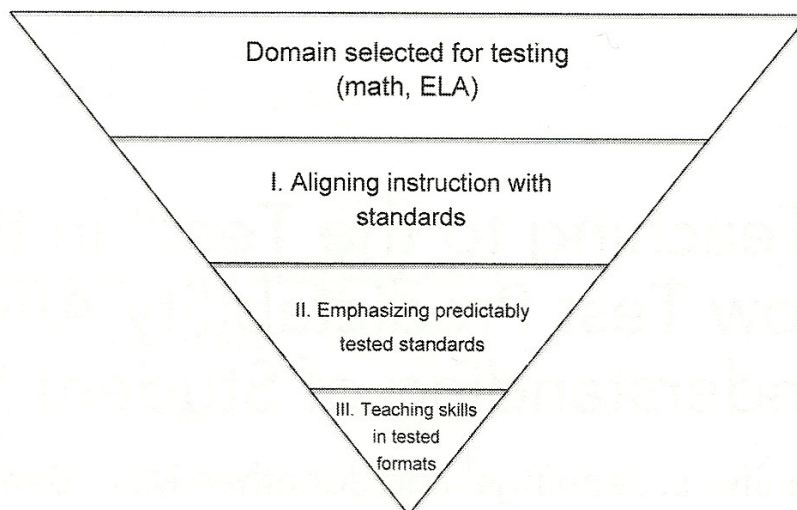


Figure 4. Jennings and Bearak's description of content-based forms of teaching to the test. Adapted from "Teaching to the Test' in the NCLB Era: How Test Predictability Affects Our Understanding of Student Performance," by J.L. Jennings and J.M. Bearak, *Educational Reseracher*, 43(8), p. 382.

Jennings and Bearak (2014) noted the considerable influence of tested content and standards in the instructional decisions made within the context of high-stakes testing. In both teachers' instructional content decisions, priority was placed on aligning course content with state mathematics learning standards. Additionally, in line with Jennings and Bearak's (2014) figure, the instructional content considerations were further narrowed to align with what the state had designed as tested standards (green standards). To a lesser extent, Minerva and Sam focused

on teaching skills precisely as they were presumed to appear on an EOC mathematics exam, though teachers were not granted access to copies of the EOC exams. Based on the Jennings and Bearak (2014) article, it appears that high-stakes testing, regardless of its format, has had a discernible impact on some teachers' instructional content decisions. The authors highlighted the weight teachers placed on tested standards and questioned whether high-stakes testing is prompting students to increase their learning, or if "students have a greater mastery of the state standards" (p. 382). Jennings and Bearak (2014) also noted alternative perspectives of teaching to the test; while neither Minerva nor Sam were making instructional decisions specifically tied to EOC questions, their content decisions were largely based on EOC-tested standards, with priority placed on those that were designed green, constituting another way for teachers to be teaching to the test. The ways in which the presence of EOC in the curriculum influenced Minerva and Sam's instruction were not unprecedented, and this indicates that despite EOC testing being a radically different type of high-stakes standardized exam, the way in which it influenced instructional content considerations is similar to what has been observed with other teachers and other high-stakes exams. Jennings and Bearak (2014) asked whether or not this influence and alignment is ultimately conducive and beneficial for student learning. As policymakers implement education policy that encourages teaching to the test, there is a question of whether they are choosing testing skill over deep learning for students.

Impact of EOC-Tested Standards on Time

The delineation of green and yellow tested standards additionally caused both teachers to adjust the pace of their instruction. In prioritizing green standards, both found that they had allocated less time for yellow standards, with even less time for untested standards. Minerva noted that she had to save fractal lessons for after the EOC was administered, as she needed to

ensure sufficient time was devoted to covering the green standards. She was disappointed to push fractal lessons back since in prior years, students were highly engaged in these lessons. Minerva saw this as an example of the ways in which EOC test preparation relegated certain concepts to the back, which in this case moved a topic that students might find relevant and fascinating. In preparation for the academic year, both teachers sketched out a pacing schedule and allocated instructional time so that each green standard would be sufficiently addressed in their instruction. Yellow and untested standards were included where time permitted, typically after EOC administration had concluded. Both teachers also accounted for review sessions in their pacing schedules. Sam ended up allocating the last month of instruction for EOC review, which further reduced the amount of overall instructional time in his class. The amount of tested standards that required coverage resulted in pacing schedules with little flexibility. Minerva found that for multiple lesson units, she had to move ahead before she felt secure about her students' understanding, just to keep close to the pacing schedule. Allocating sufficient time to cover the Crosswalk tested standards¹⁰ resulted in rigid plans in both teachers' classes. Policymakers must consider how the push to focus on tested standards influences the curricular content decisions teachers make, and how teachers may be constrained in their selections.

The time allotted for each standard also impacted the depth at which each was discussed, with longer time periods and lessons allocated for green standards, reducing the amount of time for discussion of yellow and untested standards. In the weeks leading up to EOC testing, both teachers prioritized lessons and activities that would allow for thorough review and practice. During that time, both teachers' classes focused on review and practice packets, with little lecture and no new concepts. Minerva recalled wanting to use projects in the area, surface area,


¹⁰ Per Washington State OSPI, there were 29 green standards and five yellow standards for Algebra I (2014c). For Geometry, there were 20 green standards and 19 yellow standards (2014d).

and volume unit, but the projects would take three days to complete. Feeling constrained in available instruction time, Minerva instead opted to give students practice problem worksheets, which could be completed within a day. During this particular recollection, Minerva lamented the time constraints she felt she was operating under to ensure adequate coverage of the EOC-tested standards. At the end of the year, when she reflected on these timing constraints in regards to instructional decisions, Minerva stated, “It [the EOC exam] takes away from what I think is the really good teaching” (personal communication, June 16, 2014). As a result of time constraints associated with EOC testing, Minerva was precluded from selecting activities that felt would be most engaging and beneficial for students’ learning. The pacing schedules created to cover EOC-tested standards ended up affecting the depth and coverage attached to each standard, as well as impacted the activities selected for the classroom.

Even with 80-minute blocks for mathematics classes, Minerva constantly felt she was operating under time constraints. In part, she attributed timing issues to her use of group work, as the student conversations often ran longer than she anticipated. She also spent most of class time walking around and checking in with students, often for longer than planned. Fitting in active and group learning opportunities within a regimented schedule did not appear to become easier with time. In the fourth year of EOC testing, Minerva still grappled with maintaining a pacing schedule that would cover the EOC-tested standards, but in a manner that would allow for the active learning opportunities she wanted to incorporate in her Geometry lessons.

Despite the effect EOC testing had on instructional planning and decision-making, exam results did not bear the same weight on instruction, for either teacher. Minerva and Sam noted that EOC results were not returned to teachers until the August after exam administration, well after students had left their classrooms. EOC results did not provide insight into which standards


students demonstrated difficulty with, and thus did not provide insight into what aspects of instruction were effective, and which aspects might need to be changed. Neither teacher expressed that the EOC results were helpful in their instructional decision-making or preparation for the following academic year, which calls into question the role high-stakes testing might hold in teachers' efforts to refine and improve their instructional decisions. While test results may offer a data point regarding student performance, the inability to provide details about student mastery of concepts and skills render test results an ineffective instructional tool.



EOC

End-of-Course Exam

INDIVIDUAL SCORE REPORT
SPRING 2011



STUDENT NAME : JANE C. JONES
STATE STUDENT ID : 9873 374 094

GRADE 9

DISTRICT : WASHINGTON
SCHOOL : WASHINGTON HIGH

How did JANE perform on state tests?

	Passed tests?	Scale Score	Student's Proficiency Level
Algebra 1	YES	410	Level 3 (Proficient)

Scores and Proficiency Levels

	Level 1	Level 2	Level 3	Level 4
Algebra 1	410			
	200	374 375	399 400	433 434 575

What do JANE'S scores mean?

Students in the classes of 2013 and 2014 must pass the state Math exam, or state-approved alternative, to meet the math graduation requirement. This score report covers JANE'S testing results only for end-of-course Math. You should have received another report for her Reading, Writing and Science scores in June. Please talk to JANE'S counselor to ensure she is on track for graduation. For more information, please visit www.k12.wa.us/GraduationRequirements.

How to read the chart above

For each test taken, the chart above shows JANE'S scale score, her proficiency level and the score range of each level. See definitions of proficiency levels to the left.

Algebra 1: Her scale score is **410**. This falls within the score range of 400-433, which is passing (Level 3).

What do the proficiency levels mean?

Level 4: Advanced, or exceeds standard. Represents advanced mastery of a subject's skills and knowledge. Considered as passing.

Level 3: Proficient, or meets standard. Represents mastery of a subject's skills and knowledge at grade level. Considered as passing.

Level 2: Basic, or below standard. Represents some mastery of a subject's skills and knowledge. Considered as not passing.

Level 1: Below Basic, or well-below standard. Represents little to no mastery of a subject's skills and knowledge. Considered as not passing.

Sample Student Score Report

EOC-ISR Report date: September 6, 2011
Page 1 of 2
12345-1236

Understanding JANE'S performance on the tests STUDENT NAME: JANE C. JONES SSID: 9873 374 094

Algebra 1

JANE tested at Proficient in Algebra 1.

A student performing at the **Proficient Level** is able to:

- Evaluate expressions involving rational numbers, roots and exponents
- Solve problems represented by linear inequalities, systems of linear equations and exponential equations
- Given a graph, Identify the domain/range of a function.
- Given a scatter plot, find the equation of a line that fits data.

The skills listed above do not reflect the only skills required for the achievement level. For a more detailed list, please visit www.k12.wa.us/StateTesting/ScoreReports.

How did JANE perform on specific sections of the tests?

Below, in each subject area, you'll find a percentage that indicates how JANE performed on specific sections of a test. Next to that, you'll find the percent of points needed to be proficient, which is the state target for all students. For more specific information about score reports, please visit www.k12.wa.us/StateTesting/ScoreReports

Number, operations, expression and variables: Compare, order real numbers; evaluate expressions; solve equations by expressing one variable in terms of the others.
She earned **42%** of total points. PR: **42-67%**

Linear equations and inequalities: Write, solve, graph linear equations, inequalities and systems of linear equations; translate between forms of linear equations; identify, interpret slope and intercepts of linear functions.
She earned **66%** of total points. PR: **56-78%**

Characteristics and behaviors of linear and non-linear functions: Select functions to model and solve problems; describe characteristics of functions; describe how changes in parameters affect the graph of functions.
She earned **40%** of total points. PR: **38-62%**

Data and statistics: Make, support conclusions; describe, compare data sets; use functions to make predictions.
She earned **52%** of total points. PR: **50-67%**

Course-specific Content: Use exponential decay functions to model and solve problems; solve problems represented by quadratic functions and equations.
She earned **38%** of total points. PR: **33-62%**

PR=Proficient Range. Scores that fall with

Sample Student Score Report

or Below Basic. See definitions on front.

Figure 5. Sample of the EOC exam score report sent to students' families. The score report gives an overview of a student's overall performance, performance on test sections, and whether or not the student passed the exam. Retrieved from "State Testing," Washington State Office of Superintendent of Public Instruction, <http://www.k12.wa.us/assessment/StateTesting/ScoreReportEOC.aspx>.

Focus on Retakers

Student failure of a mathematics EOC exam necessitates a multitude of local policy decisions regarding instruction and student learning. Should a student be held back and repeat the course attached to the failed EOC exam? Should the student move forward in the secondary mathematics sequence, despite exam failure? What instructional supports does a student need after EOC exam failure, and how are they best supported to pass it upon retake? The uncertainty surrounding students who fail a mathematics EOC exam, and must subsequently retake the exam and possibly the course, prompted study focus on these students, and how teachers respond to them in the classroom. The institutional response was discussed in chapter five; this section focuses specifically on individual instructional decisions and actions for students who were retakers. In this section, retakers refers to students who must retake a failed mathematics EOC exam, and students who must retake a mathematics course and the exam due to EOC exam failure. Some parts focus specifically on students who are retaking a course as a result of exam failure. Teachers discussed their observations of students who had previously failed a mathematics EOC exam, as well as observations of students who ended up retaking a course as a result of exam failure. These observations factored into the instructional decisions they made over the course of the year, and came to influence their views of the EOC testing system itself.

For students who had failed a mathematics EOC exam, either while at SHS or at their middle school, course placement became a pressing issue. As noted in discussion of the SHS retaker response, some students were retained as a result of failing a mathematics EOC exam. Students who had not successfully completed EOC testing requirements were automatically subject to retake the exam, but there was the still the question of whether to have students retake a course, either during the academic year or during summer school, or move on to the next

course in the secondary mathematics sequence. Decisions regarding course placement were made by SHS mathematics teachers, who shared their insights and observations of students with Minerva and one another to determine what course of action might be most supportive for retakers. At SHS, students who retake a mathematics course as a result of EOC exam failure were placed in heterogeneous classes; students were not placed in classes exclusively with other students who have failed an EOC exam. Minerva explained that the institutional rationale behind having some students retake the course was to provide students a second pass at course material. Fong, Jacquet, and Finkelstein (2014) also found that for some Algebra I students, repeating the course bolstered their grades upon subsequent retake, though they found that positive effects were most frequent for students who had struggled during their first attempt at the course, as opposed to students who had performed well the first time taking the course. Minerva noted that with a year of cognitive maturation and personal development, students might then be prepared to improve their course performance and pass the corresponding EOC exam. In some cases, students might also retake a course with a different teacher, exposing students to a different instructional perspective. Having students retake a course after struggle or failure presumes that repeating a course provides students with an opportunity to address deficiencies and be prepared to move forward (Roderick & Nagaoka, 2005). At SHS, the same line of thinking applied and had been an option for addressing student learning after EOC failure.

At the same time, prior research has drawn attention to potential adverse effects in the practice of having students retake courses (e.g., Fong et al., 2014; Liang et al., 2012), some of which Minerva and Sam observed in their students. Minerva found that the impact of having a student retake a course was contingent on the student's level of engagement. While some students benefitted from revisiting curricular content, other students reduced their class

participation. Minerva believed this might be the case because these students had seen the exact same curricular content the year prior and felt they already understood these concepts. Other students had poor learning experiences that discouraged their participation and academic effort. Of her students who had retaken either an Algebra I or Geometry course, Minerva observed that these students were often the most disinterested. Related to this, Minerva expressed that retaking a course would be effective only for students who recognized the learning issues and deficiencies from the prior year and were actively working to address them. For course retake to be effective, she felt that students had to be aware that recognition of a concept was not the same as conceptual understanding. Students had to distinguish learning gaps and errors, and have the intention to correct them during the second time through. Consequently, she was concerned that, in and of itself, retaking a course might not be an effective way to address all the issues that contributed to students failing a mathematics EOC exam.

Additionally, there was concern from both teachers that student confidence was being adversely impacted as a result of retaking a mathematics course. Both expressed concerns that grouping struggling students together reinforced students' negative perceptions about academic abilities, concerns that were raised in Oakes's (2011) work on the effects of student tracking practices. Similar to what Oakes observed, both teachers observed students' awareness of the labels and assumptions regarding academic ability that were attached to course placements. Based on her prior years of teaching, Minerva expressed that older students in particular were aware of being in a mathematics course with primarily younger classmates, while also being cognizant that their grade-level peers were placed in higher mathematics courses. Sam noticed similar sentiments from the tenth grade students in his Algebra I classes. From discussions with his students, Sam found that some of his tenth grade students viewed themselves as being placed

in a “dumb” class as a result of their prior failure and academic struggle. In both teachers’ classes, these students’ negative feelings were heightened when placed in sections with other students who had also exhibited struggles in mathematics. Minerva noticed the way students within a class would come to influence one another in terms of identity construction: “I think it perpetuates that, you know, cause they’re trying to create their...social identities and they’re creating social identities with others that are like themselves” (personal communication, February 13, 2014). She saw her students drawing upon one another as they created their self-identities, often in ways that reinforced negative views about their academic abilities. Students’ attitudes and approaches contributed to a classroom environment that could be supportive and encouraging, but could also turn and be largely dispiriting:

You know, you can get an environment that’s really negative, you know. The difference between a freshman algebra class and a freshman geometry class is huge. The difference between a freshman algebra class and an algebra class that has mixed grades in it is huge. Cause usually if you have all freshman, that’s not so bad, but if you get all your upperclassmen, those are the ones that are like, I am so dumb, and they have this huge confidence self worth kind of thing going on and it’s a huge barrier (Minerva, personal communication, January 24, 2014).

In Minerva’s estimation, her students were not lacking in self-awareness. Her students were largely aware of their academic struggles and the manner in which failing a mathematics EOC exam reflected on their academic stature. From observations of students, being a 10th grader who had not successfully passed the Algebra I EOC exam, or being a 10th grader surrounded by younger peers and other struggling upperclassmen, took a toll on students’ confidence levels and positive beliefs in academic abilities. Having to retake a course often reinforced these feelings for students in both teachers’ classes. Students’ responses (feeling “dumb,” labeling themselves, disengagement from coursework) highlighted the complexities of having students retake courses. In these cases, while retaking a course might have provided

opportunities to re-engage with curricular content and address learning gaps, it did also adversely impact some students' confidence and views of themselves as learners.

Additionally, having students retake a course is highly likely to set students back in their academic progressions (Fong et al., 2014; Liang et al., 2012). Sam noted the district and school urgency to ensure students successfully completed the Algebra I course and pass the corresponding EOC exam, as students who did not finish by ninth grade would be halted in their curricular sequence, with Algebra II the most advanced mathematics course they could reach by the end of four years. Minerva expressed similar concerns, and added that as part of SHS's focus on college readiness, mathematics teachers were encouraging students to reach Calculus by senior year, as this would demonstrate a rigorous mathematics course sequence and set students up to be competitive college applicants. Being set back in course progression is a significant consequence of students' mathematics EOC exam performance. Students may be set back in their graduation progress, which adversely impacts higher education prospects, but also students' postsecondary vocational opportunities. For students who must retake a course as a result of failing a mathematics EOC exam, the resulting actions have critical implications for course options, as well as graduation and postsecondary opportunities.

For some students, being enrolled in Algebra I as a ninth grader was viewed as a setback in itself. Students are able to attempt and complete Algebra I and Geometry coursework and corresponding EOC exams in middle school. Having to enroll in Algebra I as a ninth grader indicated these students were not deemed ready to attempt Algebra I as a middle school student, or that these students did not pass the EOC exam. In any case, these students were behind some of their grade-level peers in terms of enrollment in mathematics course sequence. Some previous students expressed to Minerva their awareness of the implications of

being a ninth grade student in Algebra I: “the kids see it as, I’m in the dumb class, you know, so that’s another hit to their identity” (personal communication, February 13, 2014). Her students perceived a negative label attached to their enrollment in Algebra I, as to them, it was a signal that they were unable to complete the course when their grade-level peers had successfully done so already. Some of Minerva’s students attached a label to their course placement, and there were instances of these labels being self-deprecating of their academic abilities.

Both teachers acknowledged the trend of EOC exam pass rates progressively declining for older students, reflecting a similar trend for students state- and district-wide. According to Washington State OSPI Report Card data (2015), 59.1% of ninth graders across the state passed the Algebra I EOC exam. For tenth graders statewide taking the same exam, the pass rate dropped precipitously to 22.3%. Eleventh and twelfth grade students statewide also passed well below that of ninth graders (24.8% and 21.4%, respectively) (Data comparing state and district pass rates for both EOC mathematics exams can be found in the Methods section).

Table 1

Washington State students’ EOC mathematics exam pass rates for the 2013-14 academic year.

	<u>9th Graders</u>	<u>10th Graders</u>	<u>11th Graders</u>	<u>12th Graders</u>
<i>Algebra I EOC</i>	59.1%	22.3%	24.8%	21.4%
<i>pass rate</i>	(23,372/39,540)	(4,159/18,567)	(1,629/6,564)	(511/2,384)
<i>Geometry EOC</i>	81.0%	46.6%	22.8%	14.3%
<i>pass rate</i>	(5,798/7,154)	(7,371/15,804)	(1,179/5,161)	(176/1,223)

Note. Data taken from Washington State OSPI Report Card. The data shows the percentage of students who passed each exam, with the number who passed/number who took each exam. These numbers do not include students who have passed either mathematics EOC exam prior, focusing only on students who took the exam for the first time, or on retake. For students who took the EOC mathematics exams as upperclassmen, it is highly likely they were retaking the exam, as these students would have been required to pass both mathematics EOC exams.

While the Algebra I EOC exam pass rate for SHS students across all grade levels fell below the state average, comparatively, ninth grade students had the highest pass rate. A similar trend was observed among Geometry EOC exam pass rates, with ninth grade students passing at a higher rate than their older peers. Looking at these trends, Sam discussed the priority he and his colleagues placed on supporting and encouraging students to pass an EOC mathematics exam on the first try. Though some students came into SHS having failed an EOC mathematics exam in middle school, there was a concerted effort to ensure students pass the Algebra I EOC exam by completion of ninth grade, which enabled students to stay on course to reach Calculus by twelfth grade and avoid retaking the exam as they progressed as upperclassmen. The struggles of older students in passing the EOC mathematics exams was a heavy consideration for both teachers and the SHS mathematics department at large, and prompted focus on supporting students to avoid issues that impacted students who had to retake an EOC mathematics exam as upperclassmen.

As a motivator, EOC testing may not be effective for students who have experienced prior failure with the exam. Both teachers expressed doubt in the efficacy of EOC testing as a motivator for all students, but these concerns were heightened for students who had failed already. Increased student motivation is often highlighted as a rationale for the use of high-stakes testing, presuming that the consequences attached to test performance create incentives for students to increase effort (Reardon et al., 2010). While some of her students were motivated by the existence of EOC testing, Minerva noted that “it's only a motivator for those who are successful. Only my best kids are motivated by a test” (personal communication, September 8, 2014). For her students who had already failed a mathematics EOC exam, the test itself became demoralizing – “But those kids that have always struggled with it, I’m sure they still struggled with it and they’re like, yeah that’s just another stupid test” (personal communication, September

8, 2014). Instead of rousing students to improve their academic performance, EOC testing appears to have had more of a demoralizing effect for students who had already experienced failure on one of the exams, prompting some students to discount the exam and treat it as inconsequential. Sam similarly described a “burdensome impact” (personal communication, February 4, 2014) resulting from EOC testing for his struggling students. He perceived students felt demoralized after failing the Algebra I EOC exam: feelings of being unable to pass the exam, feelings of being unable to move to higher mathematic courses, and feelings of being unable to graduate as a result of failing. Both teachers observations of student responses to EOC testing and retaking the exams calls into question the efficacy of EOC testing to act as a positive motivator for students.

Similar to findings in Kearns (2011) and Roderick and Nagaoka (2005) studies, both Minerva and Sam identified adversely impacted self-esteem and identity as glaring concerns for their students who have previously failed an EOC mathematics exam. In her study of secondary Canadian students and their experiences with the Ontario Secondary School Literacy Test (OSSLT), Kearns (2011) found some students expressed doubt in their academic abilities in response to test failure. Both Minerva and Sam found that of their students who had previously failed a mathematics EOC exam, some did exhibit a lack of confidence in their academic abilities – “Probably the most blazing [outcome] that you see with them is huge lack of confidence, cause they’ve already failed at least something once” (Minerva, personal communication, January 24, 2014). With some students, failure stayed with them and prompted feelings of despondence in academic efforts. There were noticeable concerns regarding her students’ academic confidence, as students’ lacking confidence carried over to classroom efforts. Many of Sam’s survey responses from students who had failed the Algebra I EOC prior expressed nervousness about

retaking the exam and awareness of the pressure placed on them to pass. During interviews, both teachers touched on the deleterious effect of reduced student confidence on the learning process. Students lacking confidence were more apt to “shutting down” and detaching themselves from the learning process, prompting both teachers to include student confidence considerations in their instructional decision-making in order to support retakers and their efforts to improve.

Teacher Efforts to Bolster Retakers’ Academic Confidence

Based on their work with and observations of their students, there was a concerted effort on the part of both teachers to bolster students’ confidence in their mathematics abilities. Though most of their efforts focused on supporting all students, not only those who had previously experienced EOC exam failure, both teachers directed additional efforts towards retakers. In Minerva’s class, this manifested in a focus on student ownership of learning and on providing opportunities for students to express their own strategies and understandings. On an individual level, Minerva found herself “cheerleading for [students]” (personal communication, January 24, 2014), celebrating students’ successes to bolster their confidence, and making focused efforts to develop personal relationships with her struggling students. In conversations with students, Minerva sought to learn about their personal interests and career interests, and to link these insights to mathematics learning. By developing personal relationships with students, Minerva hoped to assure students that she was a source of support and encouragement, and to bolster student confidence: “You’re just always offering that cause then they get the idea that you care about them, and you think they can do it, that’s the other thing, I think you can do it” (personal communication, January 24, 2014). In doing so, Minerva hoped to demonstrate to students that she was invested in their lives and successes. Minerva’s efforts to establish personal relationships with struggling students mirrored the efforts of some institutions that focus on bolstering teacher-

student relations as a means to improve academic performance (Bernstein-Yamashiro, 2004). In Minerva's experiences, initiating interpersonal relationships with students led to opportunities to discuss improvement and to suggest academic resources, opportunities that she might not have had otherwise and conversations that students might not have taken seriously if it had not been for their rapport with her. These efforts could be characterized as means to assure students that they have a teacher who is advocating for and supporting their academic and personal growth, by which students are encouraged to be confident learners (Bernstein-Yamashiro, 2004). Minerva's instructional decision-making included content considerations, but also incorporated deliberation about efforts to bolster students' confidence, particularly for retakers.

Sam also focused on efforts to "create opportunities for [students] to feel confident" (personal communication, February 4, 2014). As part of his efforts, he devoted greater attention during class time to students who would be retaking the Algebra I EOC exam. From her observations of Sam's classes, Minerva described his efforts to bolster students' confidence:

I love what [Sam]'s doing this year with, you know, building their confidence in algebra. If they have to be in algebra, he's really working on building their confidence that I am, I can do math and I am good at math in some way, somehow, everyone's good at math. And I do math every day. So getting them to see that and understand it (personal communication, February 13, 2014).

Minerva expressed approval of the moves Sam instituted specifically to strengthen students' views of themselves as mathematics learners. Within his Algebra I classes, Sam incorporated activities that offered detailed practice, hoping to help students build confidence in the skills central to algebraic learning. During one classroom observation, Sam's students worked on an activity termed "Rainbow Review," in which students practiced functions and graphing skills. For Rainbow Review, students were given different colored worksheets, with a skills assigned to each color. Upon completion of a worksheet, students would bring their work

up to Sam, at which point both would look over the student work and address questions or misconceptions. By utilizing Rainbow Review, Sam wanted students to have an opportunity to bolster discreet skills, address misunderstandings, and have one-on-one time with him to work through issues. During the end of the year interview, Sam noted that through the combination of practice and individual attention, some of his students, especially retakers, had strengthened their skills and were prepared to move forward in the unit. In efforts to bolster confidence, Sam focused on student confidence in skills and competency to encourage student progression within the classroom. Though his efforts to strengthen student confidence differed from Minerva's approach, it was no less of a priority in his instructional decision-making: "For students who have not previously passed the EOC, confidence is always something that I think about when I approach a lesson" (personal communication, March 6, 2014). Like Minerva, consideration for students' academic confidence was a present facet of Sam's instructional decision-making, especially for his students who were in line to retake the Algebra I EOC exam.

Addressing student confidence in their mathematical abilities was a critical component of both teachers' instructional decisions, as the cumulative effects of multiple failures adversely impacted students' sense of self-efficacy to engage in mathematics. Influence on students' self-efficacy is particularly concerning considering the impact it can have on students' academic performance. Hejazi, Shahraray, Farsinejad, and Asgary (2009) surveyed secondary students in Teheran and found that students' self-efficacy and identity influenced their academic profiles, which subsequently increased their academic achievement (measured by student grade point average). As a result of failure, students in the Hejazi et al. (2009) study self-reported a decrease in self-efficacy, which contributed to what the authors describe as "diffuse-avoidant identity style" (p. 124), associated with task avoidance and efforts unrelated to the task at hand. Among

his students, Sam observed some who had previously failed the Algebra I EOC exam responded in his class with decreased academic confidence and self-efficacy. In response to failure, the “shutting down” and detachment observed in some of his students resulted in “disinterest and misbehavior and not caring” (personal communication, February 4, 2014). Retakers in his class often disengaged in his class, refusing to pay attention or complete coursework. Sam noticed this particularly occurring with tenth graders who had multiple setbacks in their Algebra I learning:

They’re in tenth grade, they know that they have failed multiple times and these are often the students that I have the toughest time reaching and motivating. In part because I don’t think that they believe that they can do it. Actually, I think that’s mostly what it is. And I don’t blame them. If I was in a situation and I kept failing and I didn’t believe that I could actually succeed at it, I wouldn’t want to keep trying at it (personal communication, February 4, 2014).

Sam thought deeply about his students’ mathematics learning experiences, and the ways in which adverse events in their learning trajectory impacted their responses to his class. From his observations of his students, he saw how prior failure manifested in a negative manner that prompted them to shut down in his classroom. But he also empathized with their frustration and the ways that some of his students had been marginalized in the schooling system. Minerva noted similar behavior in some of her students, with students labeling themselves as incapable, or less intelligent, indicating the effect of test performance on student’s self-identity. She expressed concern for students who tied their intelligence to their EOC exam result, as some students had reasoned that they could not be smart because they could not pass the Algebra I EOC exam. On multiple occasions, her students asserted that they had deficiencies in mathematics learning, providing insight into the specific ways that prior failure had impacted her students’ views of their mathematical ability. In these cases, students often mentally distanced themselves from the learning process. Minerva acknowledged the importance of addressing issues with student confidence, while also recognizing the difficulty of the process: “If they’ve already failed it,

they've already got that, I hate math and this sucks cause I'm a failure at it, and building that confidence up is huge and hard, hard to do" (personal communication, January 24, 2014).

Similar to Sam, Minerva recognized the ways in which prior failure adversely affected students' views of mathematics learning and their mathematical aptitude. She also noted the importance of bolstering students' confidence to encourage a positive perspective towards mathematics learning and improvement. Identifying and addressing students' responses to failure are critical aspects of supportive instructional practice, particularly in helping students move past setbacks (Darling-Hammond & Rustique-Forrester, 2005). Both teachers observed specific ways that prior failure adversely impacted students' confidence and self-efficacy, and how it often manifested in disinterest and distancing. In their instruction, it was imperative for both teachers' instructional decision-making processes to also include deliberation on how to bolster student confidence, and encourage students to engage in mathematical learning as confident students.

As part of the instructional decision-making considerations for students who are retaking a mathematics EOC exam, both teachers had to account for learning gaps their students entered the classroom with. In doing so, both teachers hoped to mitigate the effect of learning gaps and encourage students to progress and take on new material. From previous years of Algebra I instruction, Minerva recalled that some students came in with gaps in knowledge and understanding of integer skills and fractions, which became critical areas to address in her instruction. In units involving fractions, Minerva noted that for some students, basic review was insufficient to address students' learning gaps and anxieties regarding the concept. Rather, she had to go back to build conceptual understanding of fractions and the meaning behind fraction operations. Sam had noticed similar issues in his Algebra I classes, with students having limited understanding of concepts that he felt should have been taught in middle school mathematics.

This was problematic for student learning because of what he noted was the linear progression of algebraic learning—since the concepts build off one another, gaps along the learning trajectory can hinder students’ subject learning and mastery. Additionally, for middle school students who had failed Algebra I, Sam was unsure about the content of their middle school Algebra I classes and what learning issues students might have developed. Sam reported having little contact with the district’s middle school mathematics teachers, who might have been able to provide insight into students’ learning experiences and where instructional focus and support would have been best directed. With the absence of a pre-Algebra class at the district high schools, students who had not completed Algebra I had no option but to enroll in Algebra I, regardless of their level of preparation for the course. Gaps in learning that had not been addressed in the prior grades had to then be addressed at the secondary level, which added an additional and necessary consideration for both teachers’ instructional decision-making for retakers.

Though retakers did not constitute the majority in either teacher’s classes, both teachers acknowledged how retakers constituted a critical consideration in instructional decision-making for all their students. In lesson planning for the entire class, Sam explained he was inclined to direct instruction towards students who had exhibited difficulty:

I tend to err on the side of teaching towards my more struggling students, some of which are those who have failed the EOC previously. I would rather teach a lesson like this on inequalities and find out that they all know it and that I've been boring them for a little while than assume that they know the prerequisite skills and forge ahead and risk losing kids who don't think they can do it (personal communication, March 6, 2014).

Regardless of the number of retakers in the classroom, considerations for their learning needs guided Sam’s instructional approaches and decisions for his entire class. In observations of Sam’s classroom, he tended to select activities that allowed for skills practice, attempting to ensure that students had mastery of these discrete skills before moving forward within units.

While he noticed that some students had progressed at a faster pace than their peers, he continued to include skills practice in his classes, as it had supported other students in catching up. From observing students work and interact in Sam's classroom, it did not appear that students were hampered or dissatisfied with his use of skills practice, though it is difficult to know student perceptions of Sam's instruction without directly talking to them. Sam's words and instructional decisions indicate that consideration of the learning needs of retakers is of critical importance, and has in different instances impacted his decisions for his class as a whole.

Though individual classrooms and schools may not have a high number of retakers, whether retaking a class or an EOC exam, there appears to be specific issues that adversely impact the learning experiences of retakers. Echoing findings from other research on student responses to failing a high-stakes exam (e.g. Kearns, 2011; Richman et al., 1987; Roderick & Engel, 2001), both teachers noted a decline in student confidence and investment in learning as result of failing an EOC mathematics exam. In response, both teachers made efforts to shore up student confidence, though through different approaches. In their instruction, both teachers also directed attention to addressing learning gaps and misconceptions that may have contributed to prior failure. The learning needs of retakers, whether retaking a class and/or an exam, are markedly different from peers who are taking the course for the first time. Adverse student confidence and self-efficacy have a vital effect on students' classroom performance; failure to address these issues may preclude improvement in student learning. Though retakers constituted a small proportion of either teacher's students for the 2013-14 academic year¹¹, it was evident that retakers did factor into their instructional decision-making.

These teachers' efforts were made with little guidance from the institution, district, or

¹¹ Across Sam's Algebra I sections, he recalled 10 to 12 students who were retakers, out of 90 total students. There were fewer retakers in Minerva's Geometry sections, which contained 64 students in all.

state policies or leaders, as none of the resources provided were specific to supporting students who have previously failed a high-stakes exam, or who are retaking a mathematics course. Researchers (e.g., Catterall, 1989; Kearns, 2011; Roderick & Engel, 2001) have outlined the particular needs and learning considerations of students who have failed a high-stakes exam, such as decreased confidence and persistence, which often differ from those of students who have not experienced such failure. Among retakers in their classrooms, Minerva and Sam both noticed confidence issues had a noticeable effect on student effort and participation. In addressing the learning needs of retakers, both teachers drew on colleagues as support, as well as prior practice; neither teacher identified state, district, or institutional resources as useful in instructional decision-making regarding retakers. Though neither teacher expressed a call for professional learning focused specifically on retakers, it is worth exploring what resources might be most valuable for teachers in meeting the learning needs of retakers, and what different practices might support students as they seek to retake a high-stakes mathematics exam.

Role of Resources and Colleagues

As part of understanding the instructional decision-making process, particularly within a context that includes EOC testing policy, interviews also focused on the role of instructional resources. The intent was to understand the resources involved in the support for teachers' instructional decision-making. Teachers were asked to discuss the instructional resources that are made available to them at the state, district, and school levels, and which resources they drew upon most in their instructional decision-making. In these conversations, both teachers discussed school- and district-provided professional development sessions, standards documents, and curricular supports as instructional resources. During interviews, teachers also discussed which instructional resources each had found most valuable for everyday instructional practice and which they found most effective specifically regarding understanding of EOC testing policy and working with retakers, including resources that were individually-sourced.

In specifying which resources were most useful in their instructional practice, both teachers frequently referenced the vital influence of their colleagues. For curricular content decisions, pacing considerations, and pedagogical methods, both teachers drew upon their colleagues. By virtue of teaching different subject courses, and due to being placed in different academies, Minerva's collegial network looked starkly different from Sam's. However, both teachers reported drawing upon colleagues in similar ways for lesson planning and instructional decision-making. Analysis of both teachers' interview transcripts indicated that colleagues were the instructional resources most frequently drawn upon in their instructional decision-making, and as part of thinking around how to integrate EOC testing considerations into their practice.

Both teachers were asked to discuss professional learning opportunities or resources specifically focused on EOC testing. These conversations revealed the scarcity of EOC-specific

resources. Teachers were then asked to discuss the professional learning opportunities and resources that were made available to them as they related to instructional support. While these resources are not specific to EOC testing, they are discussed below to understand what resources were provided, and to examine what they found supportive to their instructional practice.

State Resources

Neither teacher cited state resources as particularly vital to their instructional decision-making. State learning standards documents guided content decisions, but beyond standards and Crosswalk documents, state resources were not a major part of these teachers' instruction.

Learning standards documents. The state's Crosswalk documents did provide valuable information on the overlap between state learning standards and EOC-tested standards for both subjects. Minerva found that the Crosswalk documents "helped me see what the state saw as important" (personal communication, February 7, 2014) in terms of learning standards, information she integrated into her curricular content decisions. Both teachers accessed the Washington State OSPI web site on different occasions for information about EOC testing and learning standards. Minerva felt the web site contained few "usable materials" (personal communication, February 7, 2014) for her everyday instruction, so she made little use of this state resource in her instructional decision-making. Sam used documents outlining performance expectations on the Washington State OSPI web site, which he employed in understanding how his students' mastery would be gauged according to the state. He also referenced the few released EOC exam items that can be found on the web site. Beyond the Washington State OSPI web site and its learning standards documents, there were no other state resources mentioned as integral to either teacher's instructional decision-making.

District Resources

Similar to the discussion of state resources, neither teacher cited district resources as heavily utilized as instructional resources. District learning standards documents did help teachers in planning, but other district-provided resources were not heavily used.

Standards and supports. District-level resources and professional learning opportunities around instructional issues were made available to mathematics teachers. A district mathematics teacher on special assignment (TOSA) was made available for instructional support, though this TOSA primarily supported teachers up to Algebra I. The district also had an ongoing contract with a national training network focused on algebraic success, which provided supplemental materials for use in the classroom; Minerva had drawn upon these materials when she previously taught Algebra I classes. Teachers also discussed the district-created learning progression documents and snapshot assessments that could be used in the classroom as tools to gauge student learning and growth. While these particular resources were not heavily used as part of everyday lesson planning and instructional considerations, this gives an idea of the instructional resources the district made available to its secondary mathematics teachers.

Professional development for Common Core State Standards transition. Minerva did note that much of the district's focus for the 2013-14 academic year had been on the impending adoption of Common Core State Standards (CCSS) and the Smarter Balanced exam. The district had been proactive and began working on the integration of CCSS into district standards in the 2012-13 academic year, before most other national districts had begun this work. Minerva recalled that the district had become a resource for other districts in terms of action plans. As part of district instructional resources for CCSS, instructional modules were created, which demonstrated the overlap between CCSS and district standards. District teachers were given a map that illustrated how these modules were to be linked together, while also showing how the

modules progress from preschool up to twelfth grade. Rubrics accompanied the module map for teachers' use to gauge student understanding and demonstrated mastery. Minerva, who had been on the district committee that worked on the CCSS transition plan, noted that the district had been proactive in preparing these instructional resources and offering professional learning focused on the incorporation of CCSS learning standards.

As proactive as the district had been in providing resources around the CCSS, Minerva and Sam noted the lack of resources regarding EOC testing. For the 2013-14 academic year, district professional learning opportunities focused on preparing teachers for the implementation of CCSS, with none focused on specifically on EOC testing, or on retakers.

School Resources

SHS offered personnel and curricular supports for their mathematics teachers and their instructional practice. For the 2013-14 academic year, one of the school's major initiatives was the implementation of professional learning communities for teacher learning. School-specific professional development was offered, but at times, teachers were also allowed to select conferences and workshops as their individual professional development. As examples of school-specific resources, these will be further described and discussed below.

Professional learning communities. At the school level, professional learning community (PLC) meetings were instituted across the school as instructional learning opportunities. The PLCs at SHS were not subject specific; the PLC Sam was assigned to consisted of Algebra I and Geometry teachers. However, since the PLCs were only implemented at the start of the 2013-14 academic year, Sam found the meetings to be unstructured and dysfunctional, and not particularly supportive or helpful for his instructional practice. PLCs can be a tool to bring teachers together and instill professional learning as an embedded aspect of

instructional practice (Eaker & Keating, 2009). But the implementation of PLCs necessitates fundamental changes to school culture, particularly in increasing the collaborative nature of instructional decision-making (Eaker & Keating, 2009), changes that Sam did not observe within SHS. With time, the PLCs may become a more developed part of the mathematics department, and perhaps will become a source of supportive professional learning. Sam expressed that the dysfunction of the PLCs was at least partly tied to the constant change within SHS, as teachers had not been eager to invest in initiatives that may be ephemeral or subject to change. The success of PLCs at SHS may also be contingent on encouraging greater collaboration among its teachers, whether through changes to school culture or structuring time for teachers to meet. Greater investment in structuring of the PLCs within SHS might encourage its development and teacher utilization of these meetings as an instructional resource.

Professional development. SHS also offered opportunities for teachers to attend professional learning opportunities provided by education organizations, including some which were self-selected. As department head, Minerva was sent by SHS to attend a conference focused on developing PLCs in mathematics departments, as well as a conference on Integrated Math in preparation for the Algebra I/Geometry class that was to be implemented in the 2014-15 academic year. Regarding external professional learning opportunities, both teachers also mentioned they received institutional funding to attend self-selected professional learning opportunities, which they found most beneficial to their instructional practice. Minerva received funding from SHS to attend the Northwest Mathematics Conference, which she was enthusiastic about in recalling the opportunity to meet with other practitioners around instructional issues. Principal Edna also agreed to let Minerva and other academy teachers attend the Northwest Mathematics Conference in lieu of an onsite professional development day, something Minerva

expressed appreciation for. Sam had received SHS funding to attend a complex instruction workshop he discovered on his own, which is where he met Liz, his aforementioned curricular collaborator. Attending this conference provided Sam with insights into how he could incorporate complex instruction principles into his instruction, support he felt he was not receiving from state, district, and institutional professional learning and resources. In another instance, Sam received SHS funding to attend a workshop on visual approaches to teaching algebra, which he also felt would benefit his instruction and was missing from institutional resource offerings. From discussions regarding the resources that Minerva and Sam found most valuable to their practices, professional learning opportunities in the form of conferences and workshops appears to have been effective, particularly those that were self-selected.

There were grievances regarding the professional learning opportunities offered, as these opportunities often had little to do with the realities of either teacher's instruction. During discussions of professional learning opportunities provided by the district and institution, Minerva lamented that these tended to be unrelated to the instructional issues that affected her daily practice. She gave an example of the district instituting a day of Japanese lesson study for its teachers. Minerva was concerned about how she could encourage other SHS mathematics teachers to engage fully in the session, as she saw it as completely unrelated to the instruction teachers were in the midst of; the Japanese lesson study was not connected to any of the concepts or units that were being taught at the time. Minerva also spoke of the school's "data days" that constituted some of the academic year's professional learning opportunities. These sessions were devoted to examining SHS students' results on class and standardized assessments. While examination of student data enabled recognition of trends in student performance, Minerva did not find data days to contribute or bolster her instructional practice. Examining student data

points gave her insight into trends and patterns in student performance, but did not help her determining how struggling students would best be supported, or understand which instructional practices were correlated with student success. She reiterated that it was self-selected workshops and conferences that were most beneficial to her instruction. Additionally, none of these opportunities offered time to learn about EOC testing considerations, or discuss how the EOC exams fit into instruction. None of the professional learning opportunities mandated by the district or institution bolstered her understanding of EOC testing policy, or aided in understanding how EOC exam considerations might fit best with her instructional decisions. There were clear instances where professional learning opportunities were misaligned with the instructional context, and were unsupportive in day-to-day instructional decision-making.

Neither teacher noted much use of state, district, or institutional resources in developing understanding of EOC testing policy or EOC-tested content, or for supporting students who would be retaking an EOC exam and possibly a course. Beyond using standards documents and talking to the SHS testing coordinator, neither teacher discussed many professional learning opportunities focused on EOC testing. This may result from increased focus on the transition to CCSS and Smarter Balanced assessments, and it does indicate where the state, district, and institution were lacking in terms of supports for teachers in regards to EOC testing.

Personnel support. As an instructional resource, both teachers did receive some personnel support in their classrooms. In addition to sign language interpreters, Minerva also received some support from AmeriCorps volunteers, who were observed walking around the classroom and checking in with students as they worked on whiteboard problems. Sam had similar support in his Algebra I classroom from other AmeriCorps volunteers. From observations of both teachers' classrooms, there was typically one volunteer present at each given time. While

the availability of AmeriCorps volunteers was not consistent throughout the academic year, both teachers did express that the presence of an additional adult in the classroom was a supportive resource. With another adult presence, Minerva felt that she had an additional support to provide individual attention to students, as well as a having another available resource for students to access. While this resource is not directly related to instructional decision-making or understanding of EOC testing, it did turn out to be a supportive resource for in-class practice.

Curricular resources. On an individual level, both teachers heavily drew upon textbooks and online lesson resources in their instructional decisions and planning process. Sam listed the assigned Glencoe Algebra I textbook as a major resource in his lesson planning. He also used curricula from betterlesson.com, an online repository for curricular materials, which he found extremely effective for finding lesson ideas from a wide array of teachers. Minerva also drew from textbooks, though she more often used curricular materials from past years of instruction, as these gave her a sense of what had been effective with prior students and what lesson aspects needed editing. Both teachers also made use of the KUTA software purchased by SHS, software that allows mathematics teachers to create customized worksheets for their lessons. In addition to the web sites listed earlier¹², Minerva noted that she had started to look at CCSS resources to understand what curricular changes would be forthcoming. She found the CCSS Flipbook produced by the Kansas Department of Education an effective resource, as it laid out each standard and expectations about how students needed to demonstrate mastery of each. In their instructional decision-making and lesson planning, both teachers made heavy use of textbooks, curricular materials, and online resources.

A common theme that arose out of both teachers' discussions of heavily-used resources

¹² The National Council of Teachers of Mathematics (NCTM), Engage New York, Mathematics Vision Project, and Pinterest websites were identified as resources for lesson planning and instructional ideas.

was the value of colleagues and collaboration. Both teachers had colleagues who were regular sources of curricular material and pedagogical ideas; colleagues also acted as sounding boards for sharing ideas and perspectives. From interviews with both teachers, colleagues were identified as a major part of both teachers' instructional decision-making, as well as a resource for each teacher's understanding and incorporation of EOC testing policy.

Colleagues

In both Minerva and Sam's instructional practice, collaboration with academy colleagues was a fruitful source of material and ideas for their classrooms. Minerva explained that she and other academy mathematics teachers shared lessons plans and sent ideas and resources to one another: "We bounce things, ideas off each other, we share ideas a lot, what have we done before, what have I done before, what have you done before. When you collaboratively plan, that's, you know, the ideal" (personal communication, January 24, 2014). Even though she expressed comfort lesson planning individually, Minerva admitted that her preference was to collaborate and share lesson and activity ideas with other teachers, a sentiment shared by Sam. Sam's Rainbow Review activity is an example of a classroom activity that ended up being adopted by other SHS mathematics teachers, even among those who did not teach Algebra I. During informal observations of academy teachers' conversing with one another, there was a great deal of shared lesson plans and ideas, discussion of the lesson aspects that had been most successful, as well as discussion of how students responded to lessons. Based on informal observations of SHS mathematics teachers in their academy meeting spaces, the level of within-academy collaboration appeared to be frequent, with teachers sharing their lesson plans and ideas with one another, though the level of collaboration across the entire mathematics department across different academies is unknown. What was observed within academies was the regular exchange

of ideas. Minerva expressed the importance she placed on collegial collaboration, which enabled curricular materials to be shared, rather than each teacher needing to create materials for every single lesson. Sam also noted the role of academy colleagues in his lesson preparation and the supportive effect of sharing curricular materials. Colleagues were identified as a particularly supportive resource for everyday instructional practice.

Colleagues were also identified as supports to bolster subject matter knowledge for instruction. Minerva noted that SHS mathematics teachers shared their content knowledge with one another. Since Minerva had not taught Geometry for a number of years, she drew on her academy colleagues' understanding of Geometry in making content and alignment decisions for her classroom. Being a novice teacher, Sam was proactive in seeking support from colleagues in how to structure his Algebra I classroom. Liz, his collaborator at a different Washington State high school, was most frequently discussed as a source for instructional support, particularly in terms of how his instruction could be best structured to reflect EOC-tested content. Sam drew on Liz's guidance and her curricular materials in ensuring that his own curricular content decisions were aligned with the concepts that would be tested on the Algebra I EOC exam. Collaboration with fellow Algebra I teachers has been a primary resource as Sam continues to develop his mathematics instruction practice. Even as a more experienced teacher, Minerva noted that her academy colleagues supported her subject matter knowledge. Prior to teaching Geometry in 2013-14, she had not taught the course in a few years. Janie and Martin, two of Minerva's academy colleagues who have been teaching Geometry at SHS for the past few years, were some of Minerva's most frequent collaborators. They ended up being the colleagues Minerva referred to most often for questions that arose as she developed her Geometry lesson plans after years away from the subject. In both these teachers' instructional practice, colleagues acted as

supportive resources for pedagogical and subject matter issues.

Intersections of Colleagues and EOC Testing Policy

While Washington State OSPI and the district provided overview information about EOC testing and its standards, both teachers identified colleagues as a major source in understanding the everyday instructional implications of EOC testing. Minerva noted that she often talked to her academy colleagues to confirm which learning standards were designated green and needed to be prioritized in lesson planning. Sam relied heavily on his colleagues, especially Liz, in developing his understanding of EOC testing. As he came through Teach for America, his teacher education program did not take place in Washington State, and his courses did not discuss EOC testing. Once he entered SHS, academy colleagues became his primary source for learning details of EOC testing, including the threshold for passing¹³, as well as implications for his students. Thus far, his greatest resource for supporting his students to pass the Algebra I EOC exam has been Liz, who provided considerable support for his instructional decision-making and lesson planning with regards to exam preparation. Collaboration with Liz supported Sam in his development of instructional materials, and assured him that he was supporting his students' efforts to pass the Algebra I EOC exam. In Minerva and Sam's practice, colleagues were critical supports for instructional decision-making, as well as EOC testing understanding.

Adverse Effects of EOC Testing Policy on Collegial Interactions

Considering the role of colleagues as critical instructional resources, it is highly concerning that both teachers noted a divisive influence of EOC testing on the mathematics department. Though both had fairly different collegial networks within SHS, both also observed a clear split among teachers in their responses to EOC testing policy, within their individual

¹³ To pass the EOC mathematics exams, students must score 52%.

academies and across the mathematics department. Within the SHS mathematics department, Minerva noted a rift between teachers who prioritized EOC testing and teachers who did not. As a result of these differing perspectives, collegial interactions were invariably impacted:

It's huge how it impacts collaboration. We tend to just split into those two camps. Those tend to be the people we see eye to eye with. When we're forced to work with the other groups, it's very, it feels like I spend so much time just trying to get your point across because you're not being listened to. I don't know. It feels like there's a big picture camp and there's a linear. They have to pass this test and then they'll go do that. You're hyper-focused here and I'm focused on that, out there. Even what Geometry standards do I absolutely get my kids to learn because they need that for calculus, or they need it for pre-calc. It ends up splitting us up (Minerva, personal communication, June 16, 2014).

Though the intent of EOC testing policy is not to impact teacher collaboration, it does bear asking how this policy might be affecting the collegial structure of mathematics departments. Based on Minerva's experiences within the SHS mathematics department, it noticeably divided teachers and influenced collaboration with one another, not to mention the divisive effect it had on collegial interactions and relationships. Minerva had outlined the ways in which her instructional focus on active learning and conceptual understanding directed her choices in classroom activities. Her departmental collaborators ended up being teachers who shared a similar vision and perspective regarding classroom activities. She recalled that her suggestions of projects for the Geometry classroom were poorly received by colleagues who prioritized practice of EOC-type questions in their classrooms. As a result, she tended to collaborate primarily with other SHS mathematics teachers who shared a similar perspective towards activity choices and instructional priorities. Working with collaborators like Janie and Martin reinforced Minerva's focus on active learning choices, while it appeared that SHS mathematics teachers who focused on EOC testing preparation worked closely with one another, with little overlap and sharing across these two camps. Spillane (1999) suggested that teachers need professional development and time to discuss differences in instructional beliefs and

resultant teaching methods. With no district or institutional professional learning opportunities focused on EOC testing, there was an absence of opportunity for teachers to discuss their beliefs around EOC testing, precluding teachers from having time to engage with colleagues' differing perspectives. In examining the impact of EOC testing policy on classroom, particularly on teachers, further study of its effect on collegial interactions is needed, especially if the policy may be adversely affecting teacher relationships and collaboration.

Sam had also noticed how the departmental split in response to EOC testing might be adversely impacting the mathematics department at large. In attempts to develop a shared practice, he noted that SHS mathematics teachers often had trouble just launching collaborative efforts: "Sometimes I feel like we sort of just butt heads before we can even get started, because we're coming at it from different points of view or different sets of experiences or different priorities, you know, within our department" (personal communication, June 13, 2014). Sam also found collegial collaborations to be difficult due to differing perspectives, with his academy colleagues also choosing to work with those who held similar instructional viewpoints. His collaboration with Liz only intensified his view of the disjointed nature of his own department. Sam described Liz's mathematics department as a "much more cohesive math department, and they have much more direct and in-line support from the administrators. And I think, my impression is that a lot of the teachers [at Liz's school] are very much in-line philosophically with how they approach education" (personal communication, June 13, 2014). From his external perspective, Liz's school had much more alignment, among administrators and teachers, in regards to their instructional beliefs and purposes. Within her school's institutional structure, he felt Liz was able to collaborate frequently with her colleagues, in efforts to create a practice that all department teachers could draw upon in their individual classrooms. This was a stark contrast

from Sam's experience within the SHS mathematics department, where like Minerva, he collaborated primarily with department colleagues who approached Algebra I instruction in a similar manner. Though an Algebra I teacher who prioritizes EOC testing in his instructional decisions, Sam still found that collaborators were not always easy to find within the department. He asserted that his "teaching to the test" did not embrace rote memorization and practice, as some other teachers did. Without opportunities for teachers to engage in their ideas around the intersections of instructional practice and policy, as outlined by Spillane (1999), it is unlikely that teachers will have those opportunities to discuss their different perspectives and interpretations, and examine how they might coincide with that of their colleagues. With further training, PLCs may provide opportunities to discuss policy and practice, and bolster cohesiveness across the SHS mathematics department, allowing for a supportive structure for teachers to collaborate with different colleagues, as well as discuss and refine their instructional practices. In examining both teachers' experiences within the SHS mathematics department, it is striking how divisive EOC testing policy had been on their collegial interactions and collaborative activities, and raises questions about how this rift might be addressed.

While there are other issues that factor into the cohesiveness of the SHS mathematics department, the polarizing responses to EOC testing policy are still concerning, especially as the department is in the midst of determining how to rapidly improve students' EOC exam pass rates. For Minerva and Sam, some of their SHS colleagues were invaluable resources for thinking around instructional practice and EOC testing considerations, but there were limitations on who they felt they could collaborate with and draw materials from. In the midst of efforts to encourage students to pass the EOC mathematics exams, a wider network of collaboration within the SHS mathematics department might be a way to share effective instructional strategies and

activities. Considering the role of colleagues as an instructional resource, the varying responses to EOC testing are of note because of who SHS mathematics teachers collaborated with, and the level at which collaboration occurred, as well as the implications for how the department might continue to operate in a context that includes high-stakes testing.

In Sam's discussion of Liz's instructional context, he also brought up the cohesion between mathematics teachers and school administrators. This mention lends credence to the key influence of administrators on institutional environment, particularly the influence administrators can wield over teachers' instructional decisions. In the earlier chapter examining SHS as the institution, Minerva described what she viewed as an overt administrative focus on EOC test performance, which does not coincide with her prioritization of active learning and conceptual understanding in instructional decisions. Further complicating Minerva's relationship with SHS administrators is the fact that focus on EOC test performance comes from high up in the administrative structure: "Just pass the test, pass the test. It's that trickle down all the way from the superintendent. It's not just my principal. It's from the superintendent. [The principal] wouldn't be as hounding me like that if it wasn't from him" (Minerva, personal communication, June 16, 2014). To Minerva, administrators had an overt and persistent focus on EOC test performance that at times adversely impacted her interactions with them. While Minerva described Edna as supportive and engaged, she also acknowledged the two have different instructional priorities, as Edna had to be focused on improving SHS students' pass rates on state exams above all. Contrary to the relationship Liz and colleagues had with their administrators, there appeared to be areas of dissent between Minerva and SHS administrators, complicated by her status as department chair. The relationship between SHS mathematics teachers and school administrators added another factor into examination of collegial interactions within the school,

and how differing viewpoints and perspectives contributed to a schism around EOC testing.

From interviews and informal observations of collegial interactions, it is evident how crucial colleagues are as resources to both Minerva and Sam. While interviewing Minerva in the academy teacher office, there were multiple observed occasions of colleagues sharing curricular materials and activity ideas with one another. During interviews, both teachers pointed to collegial interactions as a means to improve and strengthen instructional practice, consistent with findings from Horn (2010) and King (2004). Considering the importance placed on colleagues as a resource, the divisive impact of EOC testing policy is concerning. Minerva indicated that it impacted who she chose to collaborate with. While she did not indicate this as an adverse effect, it did limit her collegial network and collaborating partners. Moreover, this schism constrained the exchange of ideas and perspectives regarding EOC testing, with few opportunities for SHS mathematics teachers to come together and discuss their different viewpoints. Responses within the SHS mathematics department to EOC testing policy resulted in polarizing perspectives, impacting collaboration and exchange of ideas, and potentially hampered the ability of collegial interactions to act as a resource for individual instructional practice.

The reaction from the SHS mathematics department is not an indicator of how other secondary mathematics departments have reacted to EOC testing policy. Additionally, it is unknown whether the differing perspectives are a response to EOC testing in particular, or to high-stakes testing in general¹⁴. But Minerva and Sam's accounts raise concern and questions as to whether or not other departments might be responding in similar fashion, particularly in other departments that also lack opportunities for teachers to discuss their different perspectives

¹⁴ The line of questioning asked teachers to focus specifically on EOC testing. Sam had not been teaching through the previous forms of standardized exams for secondary students: the Washington Assessment of Student Learning (WASL) mathematics section in place from 1998-99 to 2008-09, or the Washington State High School Proficiency Exam (HSPE) mathematics section in place for the 2009-10 year only (Washington State OSPI, 2014a).

regarding EOC testing. Might EOC testing policy have adversely impacted departmental collegiality in other schools? How might teachers respond within a school that has a relatively stable high pass rate on these exams? This study does not intend to generalize about the impact of EOC testing policy, or other high-stakes testing, on teacher collegiality and collaboration, but these conversations with Minerva and Sam provide insight into the impact on their mathematics department. The perceived division that exists among SHS mathematics teachers in their responses to EOC testing prompts further questions about other teachers' responses to high-stakes testing policy, how EOC testing factors into the context of collegiality and collaboration, and how other secondary mathematics departments are responding to high-stakes testing policy. This is a line of inquiry necessitating further examination, particularly within the context of study of how teachers are impacted by high-stakes testing policy.

Also concerning is the lack of professional learning opportunities that focused specifically on EOC testing. Minerva did not recall any opportunities focused on EOC testing prior to its implementation in the 2010-11 academic year, which could have supported teachers understanding regarding the learning standards changes that were being instituted (Coburn, 2004; Cohen & Hill, 2001). While EOC testing policy cannot be discounted, as all students who seek a Washington State public high school diploma are subject to state testing requirements, it can be interpreted and implemented in varying ways at the local level. Professional learning opportunities focused on EOC testing might support teachers' understanding of the changes in learning standards, and explain the delineation of standards as either green (priority) or yellow (less prioritized). Teachers could also be supported with professional learning opportunities focused on EOC exam rubrics and understanding how students need to demonstrate mastery. In Minerva's case, she sought support around fitting active learning with EOC test preparation.

Though there was state and district support around learning standards, none of the professional learning opportunities provided focused on the practical issues of the transition to these different learning standards. Darling-Hammond and Rustique-Forrester (2005) pointed out that changes to learning standards constitute a major change in the core processes of teachers' instructional practice. In the process of changing the format and content of a state high-stakes exam, focus should be placed on increasing or improving the professional learning opportunities provided to teachers to support the transition and ensure that teachers are able to engage with these changes.

Transition to Common Core State Standards

This study took place in the midst of Washington State preparing for the implementation of the Common Core State Standards (CCSS) and accompanying Smarter Balanced assessments. In Washington State, CCSS has been adopted for English Language Arts and Mathematics. According to Washington State OSPI (2015a), CCSS consists of learning standards that prompt students to go deeper into learning concepts and develop “practical, real-life application of knowledge.” Along with the adoption of CCSS English Language Arts and Mathematics standards, Washington State will also incorporate computer-based Smarter Balanced assessments into state testing requirements. As part of the Smarter Balanced assessment system, teachers will have the option to utilize interim assessments for periodic feedback on student performance, as well as the summative assessment to be given during the last 12 weeks of the academic year (Washington State OSPI, 2015b). Beginning with the class of 2016, students have the option of passing the Smarter Balanced mathematics exam to meet state graduation requirements, with the mathematics EOC exams being phased out for the class of 2019 (Washington State OSPI, 2014a). The incorporation of CCSS and Smarter Balanced assessments represent major changes to Washington State policies regarding learning standards and assessment requirements.

Though Washington State school districts were not required to implement CCSS until the 2014-15 academic year, SHS and its district had been proactive in preparing for the transition, as evidenced by the resources and professional learning opportunities provided. This shift to CCSS and Smarter Balanced also represented yet another major change in learning standards and assessment format, which impacted the curricular context of these teachers’ instructional decisions. While neither CCSS nor the Smarter Balanced assessments were the focus of data collection, references to these impending changes came up frequently from both teachers during

discussions of instructional considerations and their views on the role of education policy on their practice. Through these discussions, it was evident that the changes would be a significant aspect of instructional decision-making moving forward. These discussions also highlighted the frequent changes in state policies around standards and assessments, which neither teacher was particularly fond of, as the changes in learning standards impacted their lesson plans and curricular materials. The constant change at the state level predicated further changes at the local level, and created a context where Minerva, Sam, and their colleagues came to expect inconsistency in state policy decisions around learning standards and assessments.

Minerva described the myriad changes that had occurred within SHS and the district in her nine years at SHS. In this time, there had been three different district superintendents, as well as four different SHS principals. Compounding these local level changes were multiple state policy changes—four changes to state learning standards, changes in state assessment format (from comprehensive High School Proficiency Exam to course-based EOC exam), and changes to state high school graduation requirements. Since EOC exams were incorporated as part of state testing requirements, the conditions for passing had also been altered. When EOC testing was introduced in 2010-11, students were required to pass two mathematics subject exams¹⁵, in addition to HSPE exams in reading and writing, with a later addition of a biology EOC exam as part of graduation requirements. However, the state changed these requirements for the start of the 2013-14 academic year, necessitating that students only pass one mathematics EOC exam. For students starting high school in the 2015-16 academic year, the state’s mathematics testing requirement will change again, requiring students to now pass the Smarter Balanced mathematics assessment. In the last decade, state learning standards and testing requirements have been

¹⁵ Students were required to pass exams in Algebra I and Geometry, or in Integrated Math I and II.

subject to multiple variations, with little consistency for each shift. With the incorporation of CCSS and Smarter Balanced assessment, additional changes will undoubtedly result in significant changes within the political and social context in which these teachers' instructional practice occurs (Amador & Lamberg, 2013). Both Minerva and Sam noted that they expected major changes to learning standards and assessment to continue occurring.

Minerva and Sam outlined the significance of state and district learning standards documents in their instructional planning, highlighting the prominence of standards in instructional decision-making. Standards-based instruction was a focus of SHS and the district, necessitating that lessons be aligned with what the state and district had outlined as essential learning targets. With the multiple changes that occurred with state learning standards, which then trickled down to district learning standards, both teachers noted a feeling of trying to hit a "moving target" in their instruction. Minerva in particular expressed frustration with the inability to develop instructional material for her classes, as each change in learning standards rendered her material outmoded and in need of overhaul or revision:

And it's like how much energy do I put into developing, you know, like lessons and stuff that are going to be obsolete next year, you know, so I think that's a huge negative part of the state testing is like give us a hard target so we can, that doesn't move all the time so we can perfect our craft (personal communication, January 24, 2014).

As a result of inconsistency in learning standards, Minerva felt that she could not improve and strengthen the curricular materials she had developed. These changes also rendered effective materials from prior years of instruction immaterial, as they were then misaligned with contemporary learning standards, necessitating the reconstruction of curricular materials. Consequently, Minerva had come to begrudge the constant state-level changes, as these changes impacted the learning targets her instruction aimed to meet. At SHS, the changes to learning standards also impacted mathematics textbooks, which were not updated or replaced on a large

scale with every successive change to learning standards. Minerva found that she drew from her colleagues' curricular materials, or her prior year materials, more than the provided textbooks. Additionally, both teachers discussed having to continuously create new in-class formative assessments to accompany changes to curricular materials. Minerva in particular expressed a great deal of exasperation with the state's lack of consistency in major testing, standards, and graduation requirement policies, particularly in terms of how these changes had precluded her from editing and strengthening her instructional material. With the state and district learning standards guiding the development of curricular materials, changes to these standards did have a substantial, often unwanted, impact on both teachers' curricular materials.

Minerva described the 2013-14 academic year as a "weird transition point" (personal communication, April 28, 2014), considering the district's efforts to begin transition to CCSS. Much of the district's focus had been on providing instructional resources for teachers to incorporate CCSS into their instruction. As part of this preparation, the district had identified CCSS for mathematics as "priority standards" for teachers to focus on. For Minerva's instructional decision-making, this necessitated her working across state, district, and CCSS documents, with little overlap between state/district mathematics standards and those of CCSS. Further complicating efforts to cover these different sets of learning standards was the continued state use of EOC testing. Even as the district shifted to CCSS, its students were still subject to EOC testing requirements, as the Smarter Balanced assessment would not be administered until 2014-15. Minerva described an instructional context in which she was told by district officials to focus on CCSS, though she also needed to focus on EOC-tested standards to prepare students to pass the Geometry EOC exam. With little overlap between EOC-tested standards and CCSS Geometry standards, this proved to be a trying exercise. While this is a description of the 2013-

14 academic year in particular, Minerva’s account does provide insight into the manner by which CCSS was implemented at SHS, and highlights areas where the process was disjointed.

Minerva also noted that the Standards for Mathematical Practice outlined in CCSS are fairly novel in terms of standards, and the manner in which they should be implemented has not been prescribed or outlined by the state. The Standards for Mathematical Practice are different in that they delineate “processes and proficiencies” that students are expected to develop (Common Core State Standards Initiative, 2014a). The Standards for Mathematical Practice are focused on students’ reasoning, problem solving, fluency, communication, and perseverance. Both teachers expressed appreciation for the qualities the Standards for Mathematical Practice represent, while also recognizing that these are entirely unprecedented as a set of large-scale standards. Minerva expressed being unsure about how she would approach integration of all these standards:

“There’s more because there’s not only all the, basically the same standards as we’re already teaching, but now we have the standards [for] mathematical practice on top of it. I’m perplexed at how to even approach it next year” (personal communication, June 16, 2014). Minerva found the CCSS mathematics standards to be unlike any other learning standards she had ever worked with, which left her unsure about how to incorporate them into her lesson plans. During data collection, both teachers admitted they had started to think ahead to the following year, trying to figure out how the Standards for Mathematical Practice would be integrated into their instruction, with little guidance or precedence to draw from.

The move to the Smarter Balanced assessment also represents a significant transition for teachers and their curricular content. The Smarter Balanced mathematics assessment, based on CCSS subject learning standards, takes the form of traditional comprehensive exams, with questions pulling from different subject content. Instead of being administered after course

completion, students in Washington State will take the Smarter Balanced assessment in tenth grade. This exam is also computer-based, representing a major shift from the state's previous paper-and-pencil incarnations. From what he had seen of the Smarter Balanced assessment, Sam expressed unease about the electronic format of the exam, as he had found it difficult to navigate: "From what I've seen of the Smarter Balanced test, it concerns me. It concerns [me] because [of] the interface, and obviously, we saw a sample test, it's two years away. But the interface that we saw this spring for what it will look like, it's really convoluted. It's hard to figure out" (personal communication, June 13, 2014). Even with his technological aptitude, Sam found the Smarter Balanced exam to be confusing and unintuitive. He was concerned that the structure of the Smarter Balanced assessment might confound his students and adversely impact their performance, gauging how well they could understand the test format instead of their subject mastery. While the interface of the exam may change before it is administered to Washington State students, the exam itself represents a major transition—different learning standards and different format, with the exam being administered based on grade level rather than course completion. This represents yet another substantial change in state testing format and tested content for teachers to process and consider in their instructional decisions.

Colleagues' Responses to the CCSS and Smarter Balanced Transition

During discussions about colleagues and their influence on individual practice, both teachers also noted the manner in which their colleagues were responding to the state transition to CCSS and the Smarter Balanced assessment. Considering the critical role of colleagues in interpreting and enacting EOC exam considerations, it stands to reason that colleagues would also factor into CCSS and Smarter Balanced policy interpretation and enactment. Similarly, there were shared resources that supported understanding of CCSS, how students would be gauged in

their understanding of those standards, and how they coincided with district standards. In addition to sharing district standards documents, Minerva and her academy colleagues also shared the Kansas Department of Education Flipbook, which outlined each CCSS mathematics standard and included a rubric for measuring student understanding. Each teacher's collegial network provided a source of resources for interpreting the CCSS, and for sharing insights into how the standards fit with existing state and district learning standards.

Yet with the district's efforts to provide information and resources, there was still an undercurrent of resistance and distaste for another significant change to state learning standards and assessment format. From discussions about CCSS, Sam noted a sentiment of skepticism among his academy colleagues with this latest transition:

You know, and there are certain people that are very direct about the fact that they think this is just another fad and why are we going to spend all this time implementing it when they're going to revoke it in three years and we're going to have to learn something entirely new, I'm just going to do what I've always done (personal communication, August 28, 2014).

Sam explained that while the district had made considerable efforts to prepare teachers for the CCSS transition, this did not mitigate certain teachers' feelings that this would be yet another short-lived policy. Many of the SHS mathematics teachers had been with the school through the major changes of the previous decade, watching as the state secondary learning standards changed, the assessment format changed, and the graduation requirements changed. Based on what his colleagues had expressed, Sam sensed that these colleagues were not investing deeply in state changes because they were anticipating them to be amended or removed entirely. From discussions with Minerva, who has been at SHS long enough to experience these major state policy shifts for herself, it was evident that she had also developed a similar skepticism towards the state's education policies and their sustainability: "And it's changed over

and over. Some of the changes are good, some of the changes were never publicized enough or trained our staff enough so they really stopped” (personal communication, March 17, 2014).

Within her time at SHS, Minerva had seen multiple policy changes come through, with differing levels of investment. This string of constant major change seems to have prompted Minerva’s feelings of cynicism regarding state education initiatives and how invested she will be in each attempt to change aspects of the learning process. Based on interviews with both teachers, there was a sense that SHS teachers who have already experienced the state’s multiple changes to secondary learning standards and requirements are not eager to make major changes in their instructional practice as a result of the inconsistency that has characterized the state’s education policy decisions in the last decade. These teachers appeared to be dubious about how sustained these changes will be and how many more changes will eventually be implemented.

Although the move to CCSS is a large-scale transition, with 44 states and U.S. territories at least partially adopting these standards (Center on Standards and Assessment Implementation, 2015), the magnitude of this change has not completely assured SHS teachers that this will be a sustained initiative. Sam expressed concerns about the implementation of CCSS and its viability:

I don’t know that I truly expect a lot of consistency over the next few years. I’m hesitantly optimistic about Common Core implementation. I kind of have this like really bad feeling that it’s just going to bomb and they’re just going to scrap it in a year or two, maybe even before it has a chance to get implemented. Which would bring in a lot of uncertainty into things. Yeah, I don’t know. So much of those federal level changes impact the direction and the goals that our building even takes (personal communication, August 28, 2014).

Despite the resources and efforts tied to the CCSS move, Sam was not confident in the permanence of these standards, expecting either further change or the standards to be scrapped altogether. He was also cautious about the influence of federal-level decisions and changes, which might lead to even more instability and policy changes at local school levels. While this

did not preclude him from preparing his curricular materials and lesson plans to reflect CCSS, it was telling that he still anticipated major change ahead with these learning standards. This might be the product of the short-lived nature of state initiatives in the previous decade, or it may be based on conversations with fellow teachers. Though Sam was a novice teacher who has not practiced through the state's most recent major changes, he worked closely with colleagues who have, and whom he noticed were "jaded" in response to yet another significant change in learning standards. Sam's experiences and those of his colleagues were likely to have influenced his cautious view towards CCSS, as well as its viability and permanence.

Having started to undergo the process of incorporating CCSS into their instructional decisions, both Minerva and Sam shared insights into what each had found supportive in this process, as well as factors that had complicated the transition process. The district's efforts to create instructional modules and rubrics was an effective instructional support, particularly because there is no current textbook or curriculum that sufficiently identifies the overlap between CCSS and Washington State learning standards. These instructional modules provided a working picture into how CCSS mathematics standards might fit into lesson plans, and how students would be expected to demonstrate mastery of these standards. Both teachers indicated that the district had invested considerable time and resources into the preparation for the move to CCSS.

What Minerva and Sam decried was the lack of consistency in learning standards, and begrudged yet another change to state assessment format, particularly considering the stark differences between EOC test format and Smarter Balanced format¹⁶. Each change to existing learning standards, whether at the state or district level, prompted Minerva to have to re-create lesson plans and assessments that no longer fit with new learning standards. While changes in

¹⁶ EOC exams differ in that they are administered after course completion, while Smarter Balanced returns to administration based on seat time. In this case, Smarter Balanced goes back to being administered to tenth graders. Smarter Balanced is also computer-based, while EOC exams are in paper-and-pencil form.

learning standards may not directly impact pedagogical choices, Minerva pointed out that it did affect her curricular materials, and required her to continuously re-create materials in lieu of refining them. Sam expressed hope that after the implementation of CCSS, there would be consistency with these learning standards, which would support him as he continues to build his curricular materials. Consistency in assessment format was another thing he hoped would occur, considering his effort to align his lesson plans with EOC-tested standards. New assessments came with new tested standards that he would have to plan his instruction around. In preparation for the move to the Smarter Balanced assessment, Sam anticipated having to restructure his curricular materials to reflect CCSS, as well as figure out the format and content of Smarter Balanced questions to best prepare students for the exam. Though changes in learning standards and assessment format do not necessitate modifications to pedagogical practices, they are significant in that for these two teachers, they prompted changes in curricular materials and lesson plans. In preparation for the implementation of CCSS, both teachers found that they had to re-examine their curriculum and modify materials to reflect the new learning standards, a process that must occur again with any future change to state or district learning standards.

The manner in which Washington State has elected to implement these changes also caused consternation with Minerva and Sam, both of whom noted the lack of alignment in implementation of CCSS and Smarter Balanced assessments. While CCSS mathematics standards would be implemented for the start of the 2014-15 academic year, the Smarter Balanced assessment would not be included graduation requirements until the 2015-16 academic year. Starting with the class of 2019, Washington State students will be required to complete the Smarter Balanced mathematics assessment to meet the mathematics graduation requirement, even if students have successfully passed a prior EOC mathematics exam prior (Washington

State Office of Superintendent of Public Instruction, 2014a). The 2014-15 academic year represents a transitional year where students are expected to pass EOC mathematics exams, but teachers are required to incorporate CCSS into their instruction, even though they will not be represented on the EOC mathematics exams. Though this is only for one year, this incongruity was raised by both teachers as potentially adverse for their students, who would be learning CCSS but attempting to pass the EOC mathematics exam.

Both teachers expressed approval for the CCSS mathematics standards, suggesting that neither had an issue with the learning standards themselves, but rather were weary of the inconsistency that had been characteristic of the state's recent decisions regarding secondary learning standards and assessment. Within the SHS mathematics department, these changes led to teachers feeling jaded and unenthused about the CCSS mathematics learning standards, even though Minerva found these standards supportive of problem solving and critical thinking in mathematics, qualities that some of her colleagues prized in their classrooms. Instead of excitement, Minerva and Sam were feeling unsure: unsure of how long the CCSS will be in place, unsure of when the anticipated next major change will occur, and unsure what the next change will mean for their developed curricular materials. Though the focus of this study is not CCSS and Smarter Balanced, both teachers provided deep insights into the way their district has approached this transition, as well as the ways in which it affected their instructional contexts, even before its full-scale implementation. Their conversations also highlighted the disillusionment they perceived in their colleagues as a product of multiple changes and inconsistency. Also highlighted is the incongruity between the EOC assessments and the CCSS, and how that lack of alignment created additional instructional concerns. Both teachers noted the importance of consistency in the schooling environment, and expressed hope that the state would

instill consistency in their decisions around learning standards and assessment requirements.

Discussion and Implications

This study explores the experiences of two secondary mathematics teachers within the same high school, with many of the study's emergent themes echoing findings from other researchers on the impact of high-stakes testing systems at the classroom level. At the same time, Minerva and Sam's experiences provided insight into the impact of Washington State's high-stakes testing policy at the secondary level, which has critical implications for students' graduation prospects and postsecondary opportunities. Both teachers also illuminated experiences of teaching within the EOC testing system; while this exam will be replaced by the Smarter Balanced assessment, both teachers identified supportive and detractive elements that are likely to continue with the new system of testing. Minerva and Sam shared their experiences with Washington State's EOC testing policy, and in this section, I discuss what implications these experiences can have for testing policy in Washington State and beyond moving forward.

Their responses also provided insight into the interactions between EOC testing policy and instructional decision-making. Diamond (2007; 2012) found that the influence of high-stakes testing on instructional decisions varied across teachers, even within the same context. While these two teachers were teaching different subject matter courses, there were similarities and differences in the way EOC-tested considerations manifested in their instructional decisions, and the degree to which the subject EOC exam factored into their lessons. Examination of instructional decisions and the influence of the state's testing system on these decisions supported understanding of how high-stakes testing policy impacts instruction, and the ways in which testing influenced these teachers' instructional decisions.

One of the goals of this study was to direct specific focus to students who have previously failed one of the mathematics EOC exams, how these two teachers responded to these

students, and how retakers factored into instructional decision-making. High-stakes testing is presumed to be a tool to motivate students and school actors and spur growth in academic achievement (Heilig & Darling-Hammond, 2008), but within Minerva and Sam's classrooms, high-stakes testing was not a motivator for retakers. Because successful completion of at least one EOC mathematics exam is necessary for graduation from a Washington State public high school, the experiences of retakers is particularly pressing, especially in terms of how they might be best supported within the classroom. While neither teacher acknowledged having a foolproof plan for working with retakers, their instructional decisions and actions did highlight considerations for retakers' experiences in the classroom.

In this section, I will refer back to the study's research questions and discuss what data and analysis indicates about each teachers' instructional decision-making, and how this process interacted with considerations for EOC testing and retakers. I will also discuss the policy implications of these findings and how these teachers' experiences can contribute to broader discussions about the use of EOC exams and other high-stakes examinations in secondary schools. These findings echo prior work examining teachers' experiences within high-stakes testing systems, while also extending this research to include teachers' experiences with EOC testing in particular, and with specific focus on teachers' work with retakers.

Factors in Instructional Decision-Making

In discussing considerations for their individual lesson planning and classroom activity selection, both teachers identified common factors. Both accounted for student progression and learning needs, doing so while also seeking to adequately cover state and EOC learning standards. Though the two taught different subject courses, their lesson planning process shared many similar attributes, notably focus on aligning curricular content decisions with state learning

standards, with priority on those that were most likely to appear on the subject EOC exam. Researchers (e.g., Darling-Hammond & Rustique-Forrester, 2005; Dingman, 2010; Sleeter & Stillman, 2007) have discussed the weight given to state learning standards in instructional and curricular decisions, which is aligned with the use of standards and assessment as accountability measures. By delineating the learning standards that states expect students to master on high-stakes exams, the state can prioritize what teachers are expected to cover in their classrooms. In both Minerva and Sam's classrooms, learning standards served as the basis for content and pacing decisions. While both teachers indicated that learning standards would be a typical instructional consideration, the need to prepare students to pass EOC mathematics exams heightened the use of standards as a basis for instructional decisions.

In both teachers' instructional decision-making process, consideration was also devoted to students who had previously failed an EOC mathematics exam and needed to retake the exam. While neither teacher indicated radically differing their instructional decision-making for their retaker students, they did devote more attention to creating relationships with these students, as well as focused on bolstering these students' academic confidence. As part of their instructional decision-making, both teachers focused on the learning gaps with which many of their retakers entered the classroom, seeking to identify areas of students' confusions or limited understanding. There was also focus on building interpersonal relationships and bolstering students' academic confidence to support academic performance. While these are not content considerations, these deliberations did factor into these teachers' instructional decisions. Sam cited his use of a structured review activity as a way for students to practice discrete skills and become confident in their application of mathematical skills. Though considerations for retakers may not have been the primary basis for content or activity decisions, the gravity of these students' circumstances

and the need to support students to subsequently pass a mathematics EOC exam was indeed a factor in Minerva and Sam's instructional decision-making.

Discussions around instructional decision-making were notable in the balance Minerva and Sam aimed to achieve in their instructional decision-making. It was clear that students' learning needs were a major component of their decisions, but these decisions were also couched in a context that included the need to consider how learning standards were being covered, and how students were being prepared for EOC testing. In examining the elements that factored into these teachers' instructional decision-making, the focus on student needs and on coverage of learning standards were most frequently discussed and identified as vital.

How Did the Zone of Enactment Impact EOC Testing Considerations?

In applying Spillane's (1999) zone of enactment framework to examine Minerva and Sam's individual experiences with EOC testing policy, it is evident that individual factors influenced their differing responses, even within the same department in the same school. Capacity, will, prior practice, learning opportunities, and inducements were different in each teacher and colored the way each viewed EOC testing policy. Within each teacher's instructional decision-making, EOC testing considerations were prioritized, but they did differ in their perceptions of and responses to EOC testing policy. While Sam accepted EOC testing and learning standards as the basis of his instructional decisions, Minerva was much less amenable to having EOC testing be a focus of her instruction. She expressed that her preference was to prioritize active learning and conceptual understanding, but the pressure to ensure her students passed the Geometry EOC exam prompted focus on test considerations. By examining each teachers' zone of enactment, as it related to their individual understanding of EOC testing policy, there are discrete factors that appear to have influenced how each teacher interpreted the policy

and incorporated policy considerations into their instructional decision-making.

Prior experiences. Looking at prior experiences in particular may be one major factor in these teachers differing responses to EOC testing policy. As a novice teacher, Sam had not been in the classroom through the multiple changes that the state had enacted in terms of learning standards, assessment format, and graduation requirements. Minerva had, and expressed on multiple occasions how frustrated she was with the lack of consistency in large-scale decisions around state learning standards and assessment policies. As a result, she also had little confidence in the permanence of state decisions, which left her feeling unsure of how invested to be in each change and how her curricular materials might be impacted. Sam had noticed a similar jaded feeling among his academy colleagues who had been teaching for a longer period of time. Similar to Minerva, his colleagues were weary of the state's constant changes, and were skeptical of how long each change would be in place. It remains to be seen how Sam's response to state policies around testing and graduation requirements might evolve as he continues to grow as a teacher. Minerva's responses, as an experienced teacher, revealed frustration, which can provide insight into how this portends for encouraging teacher support of state policies decisions.

Motivation. There are some aspects of these teachers' experiences that do not fit seamlessly into Spillane's (1999) framework. In discussing the role of motivation, Spillane (1999) focused on the role of inducements and learning opportunities as motivation. However, in examining motivation in these teachers' incorporation of EOC testing policy, it is evident that they are also motivated to ensure their students pass these exams and fulfill one of the state's high school graduation requirements. Regardless of their personal feelings towards EOC testing and its application within state policy, both teachers expressed a focus on encouraging and supporting their students to pass EOC mathematics exams. There was an additional sense of

urgency to support retakers and encourage them to pass previously failed exams, with hopes of keeping students on track in their mathematics course sequence. From interviews, it was readily apparent that both teachers prioritized ensuring students pass the EOC mathematics exams.

On the part of Minerva, there was also a motivation (perhaps demotivation) to base instructional decisions on EOC testing considerations in order to appease administrators who were highly focused on students' EOC exam performance. Though this motivation had a far different desired outcome, pressures from administrators did factor into her work, especially as department chair. Administrators tasked her with monitoring the EOC exam performance of all mathematics classes and expected her to have solutions for how to raise the number of passing students. Minerva expressed that school and district administrators seemingly prioritized students EOC performance above all and "hounded" her to find ways to raise scores, which ultimately factored into her work with department colleagues. I categorize this as a different form of motivation for Minerva, one that is driven by administrators and is geared towards addressing EOC exam pass rates. Despite her misgivings about such an intense focus on EOC exam pass rates, her position as department chair and the overt focus from administrators did prompt her to devote attention to students' EOC exam performance. Whether or not it was a positive influence, these factors did result in greater attention to EOC exam pass rates.

In discussions about administrators focus on EOC exam pass rates, Minerva did question why school and district administrators were so single-minded about pass rates, but rarely discussed instructional practice or supports. In her purview, it appeared that administrators were more concerned about encouraging students to pass the EOC mathematics exams and less so with student learning and conceptual understanding. Focus on pass rates and student learning are not mutually exclusive, but in this case, it appears that administrators were more heavily

motivated by increasing pass rates, and less involved in instructional issues. This is not the case for either Minerva or Sam, but it does provide further insight into the institutional context in which their instructional decision-making occurs. Differences in the sources of motivation were apparent, and manifested in the different ways SHS prioritized and responded to EOC testing policy, in contrast to two of their teachers and their actions.

Examination of Resources

Both teachers indicated that neither the state, district, nor school provided much in terms of resources around EOC testing policy considerations, nor for working with retakers. District and school professional learning opportunities focused heavily on the transition to CCSS and how these standards would be incorporated into the classroom. While the allocation of resources to focus on the CCSS transition may be a product of this unprecedented circumstance, it does not account for Minerva's recollection of few resources being devoted to supporting understanding of EOC testing policy, even before the move to CCSS. Aside from the presence of a building Testing Coordinator, Minerva did not point to any other school-specific resources as valuable in her understanding of EOC testing. State-provided documents around learning standards and EOC-tested standards were identified by both Minerva and Sam as valuable, but were one of few that were used in instructional decision-making. This suggests that the state, district, and school-level resources provided to teachers should be more closely examined to identify areas where they could be bolstered or restructured to be valuable to teachers.

From discussions with Minerva and Sam, it was evident that both deeply valued their colleagues as resources, more so than any other provided resources. Each created lessons plans with colleagues, observed their colleagues' classrooms, and went to colleagues for advice and feedback. During observed informal conversations, Minerva often debriefed with her academy

colleagues, sharing her perspective on how her lessons had unfolded and how individual students had responded. Sam also made it clear how critical colleague collaboration was to his practice, which was particularly evident in his discussions of his work with Liz, who shared her curricular materials with Sam. In examining the instructional resources that each teacher drew upon in their instructional decision-making, the role of colleagues stood out in terms of how frequently colleagues were accessed as a resource and the exchange of ideas that occurred with colleagues.

Considering the critical role of colleagues as resources for both teachers, it is worth examining how SHS can ensure that their teachers have structured time and opportunities for collaboration. SHS had a packed schedule of mathematics courses and after-school academic support, with scant time set aside specifically for teachers to meet, either in PLCs or within their academies. Minerva lamented that with the addition of support classes, she and her colleagues had fewer set opportunities to meet during the school day and discuss instructional issues. With the addition of the Geometry support class to her schedule, Minerva consequently had less time to observe other teachers' instruction. Based on interviews with both teachers and informal observations of SHS mathematics teachers' meeting spaces, it was clear that SHS mathematics teachers had a high level of informal collaboration and communication. Finding ways to encourage this collaboration and establish collaboration time may be an effective way to provide instructional support for SHS mathematics teachers. As difficult as it might be to restructure professional learning and supports for its teachers, Minerva's responses highlight that SHS and its district should examine how their policies are supportive of teacher collaboration time.

Both teachers also talked about the professional learning opportunities each had self-selected and how these were viewed as more useful. Minerva requested a restructuring of the professional development offered, wanting the district and school to provide professional

learning that was directly related to subject course matter and classroom instruction. In the section discussing resources, Minerva had expressed that many of the professional development opportunities offered had little to do with her Geometry classroom and the active learning she sought to include in her lessons. She suggested that instead, the district and school allow teachers to select professional development opportunities, though she acknowledged the difficulty in facilitating teachers to all select different options. In allowing teachers to select their own professional development, administrators may also be concerned about the efficacy or relevancy of teachers' selections. In light of these concerns, Minerva suggested that teachers be allowed to select professional learning from administrator-approved options, enabling administrators to select relevant opportunities, but also allow teachers to select those they find most pertinent to their individual instructional decision-making and practice. In this way, professional learning opportunities could be more germane and applicable to teachers' individual practices.

Through their sharing and suggestions, Minerva and Sam highlighted potential areas of concern in terms of the instructional resources made available. Across the state, district, and school resources provided, none were focused on the issue of retakers and how their learning needs might be addressed in the classroom. The school did maintain a list of students who had failed an EOC mathematics exam in the prior academic year, which administrators used to check in with these students' teachers to ensure these students would be prepared for the EOC exam retakes. SHS did institute the Geometry support class, though enrollment was not limited to students who had failed the EOC Geometry exam prior. While these are initiatives that might support retakers in their efforts to pass upon retake, neither of these directly supports instructional considerations for retakers. Neither provides teachers with an opportunity to discuss their retakers' learning needs, or with resources that help them address these learning needs in

their practice. This is a concern in terms of the professional learning opportunities that were provided, and the lacking support for teachers in their work with retakers.

Of their retakers, Minerva and Sam both noticed that there were learning needs particular to students who had previously failed an EOC mathematics exam, especially around students' academic confidence and learning gaps. None of the professional learning resources made available to these teachers addressed these instructional considerations or provided ideas about how teachers could bolster retakers' academic confidence. These observations may be products of the district's focus on preparing for the transition to CCSS, but Minerva and Sam's experiences during this academic year highlight the lack of focus on instructional considerations for retakers, and that at times, provided resources felt incongruous with what was occurring in these teachers' classrooms. Moving forward, discussion is needed regarding how state, district, and school-level resources for teachers are responsive to instruction for retakers, and whether or not teachers view these resources as relevant to their instructional decision-making. Moreover, resources, including professional learning and disseminated documents, need to be planned out ahead of time so textbooks, for instance, don't lag behind policy implementation.

Role of EOC Testing in Instructional Decision-Making

Echoing findings by Amador and Lamberg (2013), Darling-Hammond and Rustique-Forrester (2005), and Dingman (2010), Minerva and Sam's instructional decisions were largely impacted by EOC testing by way of focus on tested learning standards. Even though the two differed in how much influence EOC testing would ideally have in their instruction, discussions about both teachers' lesson planning and enactment highlighted the pervasive influence of EOC-tested standards in their decision-making, something Darling-Hammond and Rustique-Forrester (2005) identified as a way for high-stakes testing to exert influence over teaching decisions. For

these two teachers, the presence of EOC mathematics exams acted as leverage over their instructional decision-making, impacting what was taught and, to a lesser extent, how it was taught (Amador & Lamberg, 2013). The learning standards that were prioritized in Crosswalk documents as EOC-tested standards took precedence in these teachers' content decisions.

In the cases of Minerva and Sam, there was a noticeable coupling effect, with the state exerting considerable influence over their instructional decisions. Whether or not this was the intent of decision-makers, the state selected the exam format and tied student graduation to successful exam completion, which in turn rendered compliance a necessity. With this, EOC testing was a successful tool for the state to recouple the policy and schooling spheres, and enabled the state to exert influence over aspects of these teachers' instructional decision-making (Diamond, 2012; Hallett, 2010). From interviews with both Minerva and Sam, it was apparent that they placed a great deal of weight on state learning standards, with particular attention to those that were designated as EOC-tested standards. These actions are consistent with what Darling-Hammond and Rustique-Forrester (2005) describe as "management objectives" (p. 291) of high-stakes testing use: greater control over curricular content, greater standardization of content across classrooms, and teacher accountability to cover designated content. The implementation of a high-stakes testing system effectively affected the instructional decisions these two teachers enacted in their classrooms, demonstrating the recoupling effect of high-stakes testing. The state was able to exert influence over the content that was taught, though not the pedagogical and activity choices that teachers made.

While both teachers integrated EOC testing considerations into their instructional decision-making, this recoupling effect was not unilaterally accepted. Both also acknowledged and shared their hesitations and frustrations regarding the EOC testing system. Besides concerns

about the rigid influence of EOC testing, both teachers expressed discomfort with the evaluative use of students' EOC test performance, in terms of student evaluation, individual teacher evaluation, and overall school evaluation. These concerns about the evaluative component of high-stakes testing have been observed by other researchers (e.g., Finnigan & Gross, 2007; Jones & Egley, 2004) and are unlikely to subside considering efforts to tie teacher evaluation to student test scores. While students' EOC test scores are not a component of teacher evaluation in Washington State, Minerva felt school and district administrators were gauging her efficacy as a teacher based on students' EOC results. Concerns about the inclusion of test scores in teacher evaluation will be discussed further in detail later in this section, as they relate to education policy, and highlights a teacher concern about the recoupling effects of testing policy.

The influence of EOC testing on instructional pacing was also decried, as it impacted the time and depth these teachers could devote to different concepts. Minerva felt that the pressure to cover all EOC-tested standards might have adversely impacted the depth of her lessons:

It's like that time versus quality versus quantity is always in the back of your head and, you know, I would love to spend another day on this, or you know, they can spend another couple of hours, or not a couple hours but maybe half a lesson practicing. And then maybe go on to the next topic, but then that'd put me half a day behind there and, you know, so timing does affect what do I need to get done and maybe my instruction isn't as good (personal communication, March 17, 2014)

On multiple occasions, Minerva lamented feeling rushed in her instruction and pacing, wanting more time in her lessons for students to bolster their conceptual mastery. While she felt her instruction was sufficiently aligned to learning standards, she still perceived timing and depth as areas where her instruction could be strengthened. As a result of recoupling from high-stakes testing policy, the state may be able to ensure that schools have access to the same learning standards, but this access does not extend to instructional quality (Diamond 2007; 2012).

While students across Washington State may be learning the same concepts, this does not ensure

that each lesson has the depth and time for all students to master each concept. Minerva's concerns speak to the complexities of instruction and considerations for ensuring students are developing conceptual mastery. EOC testing may act as a constraint in that the number of standards that must be covered to prepare students for testing may also preclude teachers from developing a pacing schedule that allows for lengthy periods of inquiry. This is a likely unintended consequence, but it highlights another way that high-stakes testing impacts the core instructional processes of instruction (Darling-Hammond & Rustique-Forrester, 2005). In incorporating EOC testing considerations into her instructional decisions, Minerva sought to ensure that her students were exposed to all the green and yellow learning standards. But in doing so, she had to make decisions regarding coverage and timing, and often her plans to cover the EOC-tested standards precluded her from devoting large chunks of time to concepts, and often omitting non-tested standards. In designating particular learning standards as tested content, the state did succeed in delineating concepts for focus in Minerva's classes, but also prompted her to make difficult decisions in terms of how much time could be allocated per concept, time that can be critical as students work to conceptualize and master standards.

In examining both Minerva and Sam's individual instructional decision-making, the influence of EOC-tested standards was evident. Both teachers built their curricular materials around these standards, with particular focus on green standards, as means to prepare students for the EOC mathematics exams. Having the EOC mathematics exams in place did encourage both teachers to employ standards-based instruction in their classes, which is a strategy that is purported to improve student learning by impacting academic content and pedagogical practices within the classroom (Swanson & Stevenson, 2002). Standards-based instruction falls in line with efforts to ensure rigorous curricular material in all classrooms, while also delineating that

students are being instructed according to the concepts deemed important by the state (Swanson & Stevenson, 2002). In both Minerva and Sam's classrooms, students were exposed to all the EOC-tested standards, even those that might not actually appear on the EOC exam. Whether or not this was the intent of Washington State policymakers in their implementation of EOC testing, standards-based instruction was observed in both teachers' instructional practice.

While standards-based instruction was readily integrated into both teachers' instructional practice, both also described the constraining influence of EOC testing. With the focus on covering all the green and yellow EOC-tested standards, there were concepts that were either minimized or omitted entirely from their lessons. Fractals, which Minerva viewed as relevant to Algebra II learning, were saved for the very last part of the academic year, with little time to devote to the concept. Sam noted that the sheer volume of tested EOC Algebra I standards gave him little flexibility throughout the academic year, and it was difficult to adjust his pacing schedule to accommodate students. Minerva's focus on active learning and problem-based learning also conflicted at times with the rigid pacing schedule she had set up to cover all the EOC-tested standards. For some concepts, her preference was to select problem sets that would require students to apply content knowledge and wrestle with problem solving. However, the nature of these problems required days of exploration, which is time that Minerva could not set aside in order to stay on her pacing schedule. Individually, both teachers had noted that the time and content constraints of EOC-test preparation had prompted them to focus on procedural learning, rather than on exploration and critical thinking that require more class time to conduct. Even as both teachers sought to incorporate pedagogical practices associated with student mastery and growth (e.g., student grouping, student-led discussion, manipulatives and active learning), they also felt that these skills would not be tested in EOC exam contexts. Minerva noted that the

EOC Geometry exam problems she had seen did not encourage problem-solving in real-life contexts, and instead focused on procedural knowledge; the focus on EOC preparation prompted her to prioritize EOC-type procedural problems. Thus, EOC testing constrained these teachers in terms of the concepts that were the focus of their lessons, as well as impacted the types of problems and activities that they selected for class. Considering efforts to improve students' mathematics learning and conceptual understanding, it is of concern that EOC testing may be hampering teachers' efforts to incorporate problem-solving and a broad range of content in their classrooms, efforts that can support student mastery and improvement.

Convergence of Multiple Policy Initiatives

Though the study of multiple policy initiatives was not an initial focus of this study, the theme came up on multiple occasions in discussions with Minerva and Sam, which provided insight into how the large-scale move to Common Core State Standards (CCSS) was coinciding with existing state policies. During this study, CCSS policies were part of the overarching context in which instructional decisions were made and enacted. Data collection occurred at a point in time where Washington State secondary graduation requirements had changed again¹⁷, and SHS was preparing for the transition over to CCSS, necessitating that these teachers prepare their students for EOC subject exams, but also think ahead to how their curricular materials would incorporate CCSS mathematics standards. Minerva had pointed out misalignment in the implementation of CCSS and the accompanying Smarter Balanced assessment: though the CCSS mathematics standards were to be implemented in the 2014-15 academic year, the Smarter Balanced assessment would not be included in graduation requirements until the 2015-16 academic year, leaving one year where teachers would be expected to base their instruction on

¹⁷ For the 2013-14 academic year, Washington State graduation requirements had changed from requiring students to pass two mathematics EOC exams (Algebra I and Geometry, or Integrated Math I and II) to requiring students to pass one mathematics EOC exam.

CCSS mathematics standards, but still prepare their students for the EOC mathematics exams. Consequently, Minerva expressed being unsure about what overlap might exist between EOC Geometry-tested standards and those represented in CCSS. Though EOC testing and CCSS are not diametrically opposed, there are some significant changes in content, particularly with the inclusion of the Standards of Mathematical Practice, which were entirely novel to both teachers. In this case, these were multiple initiatives that are not necessarily perfectly aligned, tasking SHS teachers with figuring out how both sets of learning standards and different priorities would coincide in the classroom. These teachers were not given training or information about the alignment of EOC testing and CCSS as an integral part of policy implementation.

This examination of SHS also highlights the differences in focus and priorities among SHS teachers and school and district administrators. According to Minerva, district administrators were primarily preoccupied with preparing teachers to incorporate CCSS mathematics standards into the classroom, as evidenced by the multiple district professional learning opportunities and resources that focused on CCSS. Additionally, in the absence of curricula that showed the intersections between CCSS mathematics standards and existing Washington learning standards, the district convened a group of teachers to examine how these two standards converged, a group that Minerva was part of. Minerva and her colleagues were then tasked with sharing insights with other teachers at their respective schools. District administrators were proactive in developing a transition plan for CCSS, but at the same time, provided few learning opportunities that focused on other EOC testing issues.

Minerva and Sam's experiences also highlight the constant change that has become characteristic of Washington education policy in the last decade, and how these numerous major changes led to adverse teacher reactions. While Sam was his first few years as a teacher, he had

already developed a level of skepticism regarding the permanence of state education policy decisions. The cynicism expressed by some of his colleagues in response to these multiple changes may have further fueled feelings of uncertainty and exasperation. In Minerva's nine years as a teacher, she had already been subject to multiple changes in state learning standards and assessment formats, in addition to turnover in local-level leadership. Consequently, she had come to view state educational decisions as impermanent, and resisted fully embracing each policy change. Minerva expressed jaded sentiments similar to those that Sam had heard from his academy colleagues: skepticism regarding why changes were occurring, and how teachers' curricular materials might be impacted. Even with concerted district efforts to prepare teachers for the implementation of CCSS, it appeared that teachers were still distrustful of the longevity of these standards, given the state's penchant for continuous change in educational policies.

The constant change appears to have been particularly pernicious because it precluded teachers from refining their instructional and curricular materials. Minerva recalled that at the start of her teaching career, a major focus for her was developing lesson plans and activities that would support students' conceptual understanding and incorporate active learning. Trial and error enabled her to develop curricular materials she could be confident in using in the classroom. But changes to state and district learning standards typically necessitated changes in her lesson plans and class assessments to address tested content. Instead of continuously refining materials for improvement, Minerva felt she often had to respond to a moving target and restructure her curricula to reflect each changes in learning standards. In examining the impact of state education decisions on the classroom, closer attention might be directed to how teachers' curricular materials are being impacted and whether or not teachers are finding it difficult to refine and improve their materials. In this case, frequent changes have resulted in skepticism

regarding teacher buy-in, which directly and negatively influenced teachers' abilities to keep current curricular material development, including learning activities.

The confluence of policies regarding EOC testing and CCSS learning standards may be particularly notable because both policies impact core instructional processes. Both teachers were direct in describing the manner in which learning standards guide their content and instructional decisions. Consequently, decisions affecting the content students are to be tested on for mastery are particularly impactful. In examining SHS and Minerva and Sam's individual experiences, it appeared that the incongruence in implementation was a point of contention, as it necessitated that teachers figure out how to integrate two separate groups of learning standards into their instruction. Additionally, the presence of these concurrent policies underscored the lack of consistency that has characterized recent state-level educational policies. These changes are not insignificant to these teachers' instructional decision-making, and highlight the ways in which constant changes are impacting teacher practice, some of which are engendering ill will on the part of teachers. Considering the role of teacher buy-in and cooperation in the success and longevity of educational policies (Cohen et al., 2007), these effects necessitate consideration in how policies are implemented and introduced into schools to ensure that the process is coherent.

Teacher Perspectives on the Use of High-Stakes Testing in Education Policy

During discussions about high-stakes testing as part of state education policy, Minerva and Sam both expressed concerns about the use of test results as an evaluative measure. They were concerned about the manner in which test performance can be used to make course placement decisions, as well as its use as a graduation requirement. Their concerns about the validity and appropriateness of standardized exams as measures of student knowledge are similar to those raised by researchers (e.g., Conley, 2015; Jones & Egley, 2004; Zimmerman &

Dibenedetto, 2008). Conley (2015) asserted that the high-stakes exams incorporated in the U.S. K-12 public school system are focused heavily on reliability across different students, rather than on validity as a measure of student understanding. Sam was similarly uneasy about the construct of EOC exams and their ability to capture student mastery and conceptual understanding, citing the inherent difficulty of constructing a test that is a true measure of what students have learned. Both teachers indicated concern with the use of EOC testing, as it is one data point in time, but also in terms of whether or not it should be considered a valid measure of course mastery.

There were also questions raised about the perceived efficacy of EOC testing as a motivator for students, particularly for students who had failed an EOC mathematics exam in the past. Researchers have asserted that high-stakes testing may actually decrease students' academic motivation (Amrein & Berliner, 2003; Ullucci & Spencer, 2009), particularly for students who have exhibited prior difficulty on high-stakes exams (Catterall, 1989; Kearns, 2011). Minerva observed that the EOC mathematics exams were only motivating for her already high-performing students. For students who had failed an EOC mathematics exam before, both teachers noticed that EOC testing was more apt to render students anxious and fearful of further failure, rather than encourage motivation to improve academic performance and pass. Proponents of high-stakes testing presume that all students will respond to testing in positive ways, but the experiences of students within Minerva and Sam's classes indicate that some students had adverse reactions. Based on their observations, both teachers expressed concern that some of their retakers were more discouraged about trying to pass an EOC mathematics exam after previous failure. Rather than increased motivation and effort, some retakers in both teachers' classes exhibited disengagement, even as they were aware that they needed to pass the EOC mathematics exams as part of state graduation requirements. Neither teacher expressed

confidence in the efficacy of EOC testing as a motivator for all their students, challenging the notion that high-stakes testing can be universally motivating for students.

Questions about the use of test results also extend to evaluations of teacher practice and its potential use as a measure of teacher efficacy. While Washington currently does not include EOC test results in teacher evaluations, Minerva feared that the state could move towards this practice, as has been done in other states¹⁸. In Jones and Egley's (2004) study of Florida elementary public school teachers, respondents expressed discontent with the use of student test scores as a measure of teaching ability, based on their concerns about the accuracy of standardized testing as a measure of student learning, as well as of teacher instruction. These concerns were also raised by Minerva and Sam, particularly as they taught in a school with a recent history of low student pass rates on state standardized exams. Both were aware that even if their students' EOC exam performance was not formally linked to their evaluations, there would still be an underlying connection in the eyes of school and district administrators, as well by some members of the public. Minerva was particularly sensitive to the use of students' EOC exam performance as a metric of efficacy as she felt that both school and district administrators linked student scores to her abilities both as a teacher and as department chair. This concern only added to the grievances she expressed in regards to EOC testing and the use of high-stakes testing in K-12 classrooms. Both teachers expressed apprehension about the utilization of EOC exam results as an evaluative measure, both for their students and themselves, and it is unlikely that their discontent is reserved only for the EOC exams. The use of standardized test results in high-stakes decisions is likely to remain a contentious point for teachers.

Washington legislators thus far have declined to incorporate students' test scores into

¹⁸ According to Hull (2013), 12 states and Washington D.C. include value-added measures in teacher evaluations. Value-added models (VAM) use students' standardized test scores as a measure of the individual impact a teacher has on students' academic growth (Hull, 2013).

state policy regarding teacher evaluations. However, with the state losing its No Child Left Behind (NCLB) waiver, which placed restrictions on how underperforming Washington schools can use federal funding¹⁹ (Kaste, M., 2014, April 24), legislators may find themselves changing their perspectives as the federal Department of Education (DOE) declines to issue a NCLB waiver. Despite research that cautions against the use of value-added models in teacher evaluations²⁰ (Baker et al., 2010), the stance of the federal DOE is steadfast in requiring states to include state test scores in teacher evaluation. Federal influence and pressure may prompt Washington legislators to include state test scores in policies around teacher evaluation, likely setting up further confrontation with other teachers who share Minerva and Sam’s reservations about the appropriateness of the use of state test scores as a measure of teacher efficacy.

Limitations

This study explicates the experiences of two secondary mathematics teachers and their instructional decision-making within a context that includes high-stakes state testing. Minerva and Sam were asked to discuss their instructional decision-making process, and the influence EOC testing exerted over this process. These findings are not meant to be generalized with regard to other state testing systems, or to other school contexts. While these teachers were asked to discuss the actions of school and district administrators with regards to EOC testing and retakers, this study is not an evaluation of those school or administrator efforts. This study specifically focuses on teachers’ instructional decisions within the context of EOC testing.

Future Directions for Research

Broader examination of high-stakes policy and its impact on the classroom is necessary

¹⁹ Public schools identified as “underperforming” must use federal funds to procure remedial services from “private vendors.” Schools may also be labeled as “failing” and potentially have staff members replaced (Kaste, M., 2014, April 24).

²⁰ Baker et al. (2010) assert that there are serious issues with reliability and validity in value-added models. They found that the results can be unstable across models, years, and classes, which raises questions about its use in high-stakes teacher placement decisions.

in understanding its role within accountability systems, and how the individual actors tasked with understanding and implementing this policy are working within this context. Further research on high-stakes testing policy should consider the following issues: responses from teachers in various schooling contexts, the development of effective accountability systems, the relationship between teachers and policymakers, understanding the impact of frequent policy changes on teachers, the intersections of high-stakes testing and best instructional practices, and students' perspectives and experiences with high-stakes testing systems.

Teachers' experiences across contexts. As this study consists of two teacher cases within one high school, the intent is not to generalize to other school contexts, but to identify and highlight themes that support understanding of the manner by which high-stakes testing impacts the school level. In particular, this study sought to contribute to understanding teachers' roles as instructors and policy enactors, and what their perceptions and experiences were with state high-stakes testing policy. Minerva and Sam both expressed concerns about the appropriateness of utilizing a single standardized exam as a measure of a student's content knowledge and teachers' instructional prowess. These are similar to concerns discussed in Finnigan and Gross's (2007) study of Chicago Public School (CPS) teachers, where teachers questioned the accuracy of the Iowa Tests of Basic Skills (ITBS) as measures of students' skills. Further research would seek to include more teachers in different school contexts to identify potential larger themes, and potential differences in how teachers respond to high-stakes testing policy. I would like to examine the experiences of teachers in high schools where students have high pass rates on the state's standardized exit exams, as it is likely that these teachers experience different pressures and messaging around high-stakes testing. Additionally, my future research would seek to expand study of teachers experiences with high-stakes testing policy to schools in a wider variety

of location contexts (e.g. rural, urban school districts). This would facilitate study of how teachers in different contexts respond to testing policy. In doing so, study could also expand to examine how district resources and context also factor into resource availability and response capacity. The goal would be to connect research on teachers' perspectives and experiences to those examining how school administrators and students alike perceive high-stakes testing.

Accountability systems. Despite these teachers' concerns about EOC testing and its inclusion as part of state graduation requirements, both teachers also expressed acceptance and understanding of the need for accountability within the state's public K-12 system. Similar to the findings of Diamond's work with Chicago teachers (2007; 2012), the teachers here agreed with having accountability measures in place to be able to gauge and measure student learning, and how students were progressing in meeting learning targets. Where their views diverged was with how an accountability system should be structured to best support student achievement:

And it's like, we can sit here all we want and say, 'Yeah, we want all kids to have the same opportunities.' But what do you do ... That's more of a mindset of, "How do we design an entire system from the ground up?" Yes, we want to make sure structures provide all kids the same opportunities. But I think it's a different mindset to look at the student in front of you and say, "What does this person need?" As a person, what do they need? (Sam, personal communication, June 13, 2014).

Sam's views on accountability centered on examining students holistically; rather than basing accountability on students' test scores as data points, Sam called for an accountability system tailored around students' particular learning needs. Rather than have a system that is punitive in its application, he viewed accountability as being responsive to students as individuals, something that is not an underlying principle of high-stakes testing systems. As part of efforts to ensure that all students have access to high-quality learning opportunities (Sleeter, 2005), learning standards and accompanying exams have been incorporated into state-level accountability systems. While these efforts can increase standardization in the learning standards

that teachers instruct according to, Sam decried what he felt was a move away from individualized attention to students. Rather than focus solely on students' test scores as a measure for accountability, Sam expressed wanting to have a system in which administrators and teachers focused on students' particular learning needs, and focused efforts on meeting those needs instead of directing so much attention towards high-stakes testing performance. These sentiments were similar to Minerva's and exemplified in both teachers' efforts to connect with students on an individual level, providing academic and interpersonal supports. Research could examine the effects of individualized attention on students, both in terms of students' academic performance but also students' personal development and academic confidence.

During individual discussions, both teachers noted the need to have institutional focus on individual students, as this would encourage an environment where students receive targeted support, as well as evaluate students as individual beings, rather than as the sum of test scores. Similar to the sentiments expressed by Sam, Minerva suggested a school-wide mentoring system, particularly for students who have exhibited academic struggle, as a way for school actors to identify and address individual student learning needs. In her view, the purpose of an institutional mentoring program would be to: "Find out what they need and have time to talk to them. If that's not what you need, what is it do you need? How can we help you?" (personal communication, June 16, 2014). By implementing a mentoring program, Minerva hoped students would develop relationships with school staff, and come to see school staff members as caring supports. Research could examine how schools might implement a system where students receive mentoring or individualized attention as a way to improve student learning outcomes and address learning gaps. Future research could also examine how attention to individual student needs fit within a broader accountability system, as it supports schools and districts identifying

gaps in learning and student outcomes, though this kind of data would be more challenging to quantify, and it challenges the current data-driven conception of accountability. Further research in the development of accountability systems would examine what factors are most relevant and illustrative of students' learning progress, and how these can be captured at the state, district, and school levels to create a system that has support from multiple stakeholders.

Communication between teachers and policymakers. A common response across discussions with both teachers was the desire to have greater teacher input in the state's education policy decisions. Research could further connect the schooling and policy spheres, providing policymakers with feedback on teacher perceptions of education policies, and on how the relationship could be structured to be more inclusive of and responsive to teachers. During a discussion about perceptions of state education policy decisions, Sam noted a feeling of disconnect between himself and state policymakers:

It seems that we're always making decisions that respond to the latest mandate, you know, that we're not equipped to start tomorrow even though we're supposed to. And so I think for my practice that could be very important. You know, I think like long-term, that is something that would really frustrate me as a professional. And I think I mentioned to you before, but staying in education long-term is something where in order for me to feel comfortable doing that, I will need to continue to feel like I have a voice in the system in some way (personal communication, August 28, 2014).

Even as a novice teacher, Sam was critical of the manner in which state education policy decisions were made with little input from teachers, or consideration for the different contexts in which state teachers operate. Moving forward in his practice, Sam expressed the need to have teachers contribute to discussions and decisions around education policies. Sam's desire to have greater input in educational policy decisions is worth further exploration, as it relates to the development of educational policy decisions, but also to examine how prevalent these feelings might be in other teachers. Teachers in Jones and Egley's (2004) study registered similar distaste

with Florida's legislators, who they felt were making education policy decisions without teacher input, and who consequently wanted a larger role in policy discussions. With teachers operating as local-level policy enactors (Cohen et al., 2007), it is imperative to study teachers' perspectives towards policies that they are tasked with implementing within their school contexts, as such research could contribute to closing the perceived gap between teachers and policymakers. Such an approach could also support the development of policies that are responsive to teachers and their varied classroom practices. Mayrowetz (2009) suggested that policymakers devote more consideration to teachers' sensemaking in their interpretation and enactment of education policies. In doing so, policymakers can develop a stronger conception of how teachers' instructional practice can be impacted by policy decisions (Mayrowetz, 2009), which would contribute to policymakers' inclusion of teacher perspectives. Both Minerva and Sam requested that state legislators actively solicit input from teachers, as this would allow legislators to better understand the complexities of instructional work, while also giving legislators a sense of the varied school contexts within which Washington State teachers operate.

Understanding impact of policy changes. Future work would also seek to understand how multiple changes and shifts in state education policies are impacting work at the school and district levels. In their responses to questions about state-level education policy decisions, Minerva and Sam each described the lack of consistency in state decisions, which left both teachers feeling as though they had to continuously change their materials to respond to state mandates. Minerva in particular noted the myriad state policy changes that had been implemented in her nine years of teaching: multiple changes in state learning standards, which preceded changes to district learning standards, and multiple changes to state graduation requirements. To better understand the relationship between the schooling and policy spheres,

research would seek to examine the rate of change in state policy changes around standards, graduation requirements, and assessments, which critically impact teachers' school contexts. Research would also examine teachers' responses to policy changes, and the perceived impact of these changes on their instructional practice, with the goal of identifying and communicating the specific ways in which the policy sphere impacts what occurs within the schooling sphere.

Best instructional practices and high-stakes testing. In examining effective practices in mathematics instruction, research would focus on the intersections between identified best instructional practices and high-stakes testing. What prompted this line of inquiry was Minerva's discussion about her preference for active learning and problem-based learning in her classroom, and how focus on EOC preparation constrained her use of these instructional approaches. Both Minerva and Sam expressed concern over the EOC questions prioritizing procedural knowledge, rather than on exploration or critical thinking. In particular, Minerva noted that the short response questions had been phased out of the EOC mathematics exams, which are the few opportunities that students have on the test to demonstrate and show their critical thinking and problem solving skills. Further research could also support the development of high-stakes mathematics exams that prompt students to employ problem solving over procedural knowledge. In Minerva's case, she would like to have high-stakes exams include questions with real-life applications, as well as questions that prompt students to explain their solving processes. If high-stakes testing remains a fixed aspect of educational policy, it follows that the assessments be evaluated to examine how test questions gauge students on desired high-level mathematics skills.

Student perspectives. In fully understanding the impact of high-stakes testing on individuals, research would also extend to capturing and explicating student perspectives on testing. While students were not the focus of this study, their experiences with the state's testing

system could be revealing in terms of how motivating students themselves find high-stakes testing. Does the presence of high-stakes testing spur students towards academic improvement? Students could also provide insight into the messages and signals that teachers and school administrators provide around high-stakes testing. I would be especially interested in the perspective of students who are in schools with low pass rates on state exams, as these students are subject to overarching pressures to rapidly improve performance outcomes. How do students perceive these pressures and corresponding school actions, particularly for students who must retake a high-stakes exam? In regards to teachers' instructional decision-making, students could also provide valuable insight into the perceived influence of high-stakes testing on curricular content. For students who are in schools or classrooms with an unyielding focus on test preparation, I would be interested in students' perspectives on the efficacy of test preparation, and how their academic interest and engagement might be impacted by overt focus on high-stakes testing preparation. In order to fully understand the impact of high-stakes testing policy on the classroom level and on students' academic outcomes, capturing student perspectives and learning experiences is a necessary direction for future research.

Concluding Thoughts

As part of efforts to improve learning outcomes for all students, focus on increasing access to high-quality instruction and rigorous academic standards is a logical facet for inclusion. However, there is a persistent question about the role of high-stakes testing as part of these efforts. How does high-stakes testing fit with efforts to increase student access to high-quality instruction? Additionally, there are persisting questions about the efficacy of high-stakes testing as a motivator for students, particularly for students who are experiencing academic difficulty or have failed a high-stakes exam in the past. In examining high-stakes testing as part of education

policy, my intent is to understand the effect testing policy can have at the school level, and the efficacy of high-stakes testing as a policy tool to improve student learning outcomes. Part of these efforts is focusing on the role of teachers, who occupy multiple roles as instructors and local-level policy enactors. As their practice is impacted by the sociopolitical context in which their schools are situated (Amador & Lamberg, 2013), it is imperative to examine how the policies enacted in this context are affecting teachers' instructional decisions, which in turn influence the learning opportunities that students are afforded.

Both Minerva and Sam noted the pervasive influence of EOC testing considerations on their instructional decision-making, stemming from the state and district levels of governance. Both teachers structured their curriculum and activities to correspond with EOC-tested standards, prompted by pressure from administrators to improve the school's EOC exam performance. These pressures were pronounced in supporting students who had previously failed an EOC mathematics exam and needed to pass on retake in order to meet state graduation requirements. But at the same time, both teachers also seemed to be driven by their own internal desire to see their students pass the EOC mathematics exams, even as both held reservations about EOC testing policy itself. While EOC testing considerations guided content decisions, a lot of instructional decision-making also stemmed from both teachers trying to identify and address their students' learning needs, which are not the purposes of EOC testing. Both teachers noted that EOC testing acts a means to gauge student understanding and mastery, but that the presence of the exam itself does provide details on the concepts students have mastered or have difficulty with. Consequently, EOC testing did not operate as a tool to improve or refine instructional decisions, and it is worth asking if EOC testing supports other teachers in terms of instructional refinement or improvement based on student performance. These teachers' cases demonstrate the

influence state testing can wield over content decisions, but also highlight that testing alone is not a tool for teachers' instructional improvement (Diamond, 2012). High-stakes testing can recouple the schooling and policy spheres, but it bears questioning whether or not state actions encourage instructional improvement that is correlated with student learning and mastery, or if it prompts singular focus on test preparation and performance.

High-stakes testing proponents often assert that teachers and administrators in low-performing schools are not paying enough attention to their students' outcomes, or working hard enough to address their students needs (Finnigan & Gross, 2007). High-stakes testing is then supposed to redirect teacher, administrator, and student efforts towards academic improvement, with all parties motivated by potential rewards and sanctions based on exam performance (Finnigan & Gross, 2007). Based on Minerva and Sam's experiences with EOC testing, it is fair to question the claims of high-stakes testing being a motivator for both teachers and their students. For these teachers, motivation resulting from EOC testing appeared to center on preparing students to pass and to avoid rebuke from school and district administrators, but neither was motivated by belief that EOC testing alone would improve student learning. Of their students, Minerva and Sam both noted that EOC testing was not particularly effective as a motivator, even operating as a de-motivator for some of their struggling students. Neither teacher identified EOC testing as a motivator for instructional improvement, nor as a visible motivator for students to improve their academic performance. The perspective of high-stakes testing as a catalyst for increased academic effort and performance appears to be shortsighted, and disregards other factors that do act as motivators for teachers and students.

This view also simultaneously positions teachers and their schools as both root of academic issues and as the actors tasked with fixing deficiencies in student outcomes (Jones &

Egley, 2004). As with other efforts at school reform and accountability, high-stakes testing could be a viable tool for instructional improvement, but such a system must also include supports and resources for teachers to deeply learn about instructional issues (Darling-Hammond & Rustique-Forrester, 2005; Finnigan & Gross, 2007). Rather than place blame on teachers, reform efforts would be better supported by valuing teachers and encouraging their development and improvement. Part of these efforts should include professional learning and resources relevant to teachers' instructional contexts, efforts that communicate teachers will be supported and acknowledged as professionals. In examining high-stakes testing as part of state accountability systems, there is a concern that testing will adversely impact teachers' motivation to stay in the teaching profession (Finnigan & Gross, 2007; Jones & Egley, 2004). Sam acknowledged that larger education governance decisions do factor into his perception of the teaching profession, and future decisions that continue to marginalize or remove teachers from accountability decisions would prompt him to leave teaching altogether. Rather than utilizing potentially punitive measures in these accountability systems, we might consider how it can be constructed to support teachers and encourage their development, and constructed so teachers view themselves as valued participating members of education governance.

The logic of action underpinning the use of high-stakes testing assumes that testing can be a policy tool to spur academic improvement and ensure that all students are being assessed by the same metric. While the intent of high-stakes testing is to encourage students and school actors to focus their efforts on academic performance, many of the concerns and issues discussed by Minerva and Sam echo those raised by other researchers. Concerns regarding the punitive nature of EOC testing policy and administrative prioritization on test performance have been highlighted by researchers (e.g., Amrein-Beardsley et al., 2010; Perna & Thomas, 2009), along

with concerns that high-stakes testing is overwhelming punitive towards the students it is supposed to support (Perna & Thomas, 2009). These teachers also noted the pervasive influence of tested standards in content decisions, and the tenuous use of testing as a student motivator (e.g. Dingman, 2010; Kearns, 2011). These questions are pertinent as they continue to raise issues with the efficacy of high-stakes testing as a policy tool to improve student learning outcomes, and as a tool for instructional improvement. The instructional work of teachers is largely impacted by high-stakes testing and the learning standards these tests compel students to master. Considering the influence high-stakes testing can have on teachers' instructional decisions, it bears asking how this influence is impacting teachers' practice and students' learning opportunities across schooling contexts. These persisting questions must continue to be examined and addressed as states determine the role high-stakes testing ought to have in decisions regarding student graduation and placement, and as part of efforts to improve the K-12 public schooling system and student outcomes.

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