WHERE ARE THE BOUNDARIES OF MATHEMATICS EDUCATION (POLICY)?: COMPARING TWO SCHOOL DISTRICTS AND THEIR SUBJECT-MATTER CONTEXTS

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

For Hien, my mother
without your sacrifice and love,
this would not have been possible

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ABSTRACT

To achieve ambitious and equitable mathematics education, districts will likely have to extend their improvement efforts beyond the bounds of classroom teaching and learning. However, the literature has yet to explore the boundaries that determine which policies are relevant (or not) to mathematics, or how the subject-matter acts as a context for such framing. To that end, I conducted a comparative case study of two school districts through interviews with district leaders, observations of policymaking, and collection of artifacts. Mediated by the size and segmentation of districts' organizational structures, I found that districts' policy boundaries were shaped by the dominant mathematics-related discourses circulating in the district and its local community, including discourses related to accountability and the subject's epistemology. Discourses related to equity and pedagogy were more contested, and also less influential in boundary framing. Though there was some attention to inquiry-oriented instruction at one district, both districts' boundaries around mathematics were primarily constrained to issues of achievement. Subject-neutral policies were sometimes implemented in mathematics-specific ways, but other subject-neutral policies—including equity-minded efforts—never crossed into mathematics. These findings suggest that researchers and educational leaders interested in reshaping districts' policy boundaries should attend to how the subject-matter interacts with policies—even seemingly subject-neutral ones—to constrain policy enactment.

CHAPTER 1: INTRODUCTION

Mathematics education research has undergone several shifts, or "turns." Moving away from *process-product* research that attempted to quantify teacher effectiveness by connecting teaching practices to student outcomes (e.g., Good & Grouws, 1977), the *interpretivist-constructivist* turn focused on understanding, rather than predicting, mathematics teaching and learning (Stinson & Bullock, 2012). This research primarily drew from Piagetian psychological theories (e.g., constructivism) that attended to how individuals acquire knowledge. Emphasis on the individual's cognitive functioning then gave way to considerations of mathematics teaching and learning as products of social activity. Adapting theories from the fields of anthropology, sociology, and cultural psychology, this *social* turn saw research focused on, for example, "communities of practice" and "learning as participation" (Lerman, 2000). For some scholars, however, mathematics teaching and learning are not only shaped by social and cultural factors, but also political factors. Acknowledging that mathematics teaching and learning are political activities, research in the *sociopolitical* turn engages in "theoretical perspectives that see knowledge, power, and identity as interwoven and arising from (and constituted within) social discourses" (Gutiérrez, 2013, p. 40).

These turns have each successively expanded the questions and theoretical perspectives mathematics education researchers engage with. In other words, each turn has shifted the *boundaries* of the field, including how the field is defined and what counts (and does not count) as mathematics education research (Martin et al., 2010). Such boundary shifts have also led to new framings about persistent problems—and solutions—in mathematics education. For example, the turn away from what Ellis and

Berry (2005) called the “procedural-formalist paradigm” towards cognitive, cultural, and political considerations in mathematics education reframed the problem of reform from depositing mathematical knowledge into students to supporting students to communicate and engage in critical thinking about important mathematics concepts. This problem framing allowed for new solutions that would have been largely irrelevant under the “procedural-formalist paradigm,” such as supporting students to collaboratively construct mathematical understandings and connecting mathematics to students’ lived experiences.

This paradigm shift is reflected in the field’s (developing) characterization of effective mathematics teaching. Not only focused on supporting students to develop conceptual understanding of important mathematical ideas, engage in problem solving and sensemaking (e.g., Hiebert & Grouws, 2007), and participate in mathematical discussions with their peers (e.g., Stein et al., 2008), this vision also addresses issues of equity. Undergirded by a belief that all students can and should learn mathematics, researchers have argued that students should also have opportunities to engage in mathematics that positively affirms their identities (e.g., Aguirre et al., 2013), connects to and builds on/from their linguistic, cultural, and community resources (e.g., Civil, 2007), and use mathematics to critique societal inequities (e.g., Frankenstein, 1990).

Despite decades of efforts towards this vision of equitable and ambitious mathematics education, mathematics educators have yet to fulfill such promises (Hiebert, 2013), particularly for historically underserved students (Martin, 2015). Some scholars suggest that mathematics education contributes to sustaining this problem (Lundin, 2012), as organizing research around the learning—and teaching—of mathematics necessitates “investigating problems as if they could be solved through better classroom practices," and inhibits inquiry into "the social and political aspects involved in reforming mathematics education" (Pais & Valero, 2012, p. 18). For example, a focus on just teaching and learning is unlikely to interrupt "the way schools are structured as credit systems, where year after year teachers are asked to mark students with a grade that will determine their future possibilities" (Pais, 2014, p. 1088).

From such a perspective, rather than strictly didactical, the problems plaguing mathematics education are related to the economic and political implications of school mathematics (Davison & Mitchell, 2008; Straehler-Pohl & Pais, 2014). These problems, however, typically fall outside the boundaries of mathematics education. Though the turns previously described have expanded the field's boundaries, it seems the four walls of the classroom continue to demarcate the possibilities for reform. For example, while the sociopolitical turn has started to attend to issues of identity and power, the analysis of such issues has been primarily directed at mathematics teaching and learning (Pais & Valero, 2012), leaving economic and political problems—and solutions addressing such problems—largely outside the boundary.

With the classroom as the focus of mathematics education research, issues of district policymaking and practice have largely remained outside the boundaries of the field. This is problematic as "classrooms are situated in and inextricably linked to the broader school and system" (Coburn, 2003, p. 6), where the settings in which teachers work support or constrain their learning and practice. So, improving mathematics education is not only a problem of supporting students' and teachers' learning, but also organizing the institutional settings in which teachers work in ways that support them to develop and refine their practice (Cobb & Smith, 2008).

Because school districts are an important lever for improving education (Cobb & Smith, 2008; McLaughlin & Talbert, 2003; Spillane, 1996), understanding the extent to which districts are also bounded (to the classroom) in their improvement efforts informs how successful such efforts can be in achieving the field's vision. Indeed, (mathematics) education reform in recent decades has been largely defined by curriculum (e.g., National Science Foundation-funded "reform" curriculum), standards (e.g., Common Core State Standards; NCTM, 1989; 2000), and accountability (e.g., No Child Left Behind; Every Student Succeeds Act), all of which have certainly penetrated schools and districts. It is then, perhaps, unsurprising that researchers have found that districts tend to focus their mathematics-related problems around external policies, like state standards and tests (Burch & Spillane, 2005), as opposed to issues of equity or students' experiences (Munter et al., 2023). While this research has revealed the general focus of improvement efforts, the field knows little about the underlying logics that define and determine what counts (e.g., state tests) and does not count (e.g., equity) as *policies* for mathematics education. That is, it is unclear how the *boundaries* around mathematics education policy are *framed* in school districts. By policy, I refer to both the actual *text* encoded in documents, as well as the policy problems and solutions constructed through *discourse* (Ball, 1983), where discourse includes language, and the practices, assumptions, and ideologies reflected in and enacted through that language (Gee, 2014; Anderson & Holloway, 2018).

Boundaries are consequential because they categorize people, practices, and objects (Lamont & Molnar, 2002). As the medium for social exclusion, boundaries reproduce inequality (Lamont, 1992), but changes in boundaries can result in more inclusion and equity (e.g., Rao et al., 2005). One graduate physics program, for example, increased access for underrepresented students by expanding the boundaries that define what counts as the ideal physics student (Posselt et al., 2017). For school districts, the boundaries around policy for mathematics education demarcate and constrain the sorts of efforts districts engage in to support and improve mathematics education. This is particularly important because, as Pais and colleagues (2012; 2014) have argued, reforming mathematics education will require attending to problems and solutions that extend beyond the boundaries of classroom teaching and learning.

The ways boundaries are framed, and the extent to which they allow for new framings to problems and solutions for reform, however, depends on broader institutional contexts and the *discourses* in circulation that individuals may draw upon. For example, as alluded to earlier, each turn in mathematics education research expanded the boundaries of the field by drawing upon different discourses about mathematics teaching, learning, and society. The social turn saw mathematics education researchers taking up epistemological discourses aligned with emerging sociocultural theories (Lerman, 2000), while the more recent sociopolitical turn engaged with critical and post-structural perspectives (Gutiérrez, 2013).

Implicit in these turns, and therefore how the field's boundaries are constructed, are also questions regarding "What mathematics? For whom? And for what purposes?" (Martin et al., 2010, p. 14). For example, research in the "procedural-formalist paradigm," described earlier, drew upon discourses that mathematics learning involves the repetitive practice of skills and procedures (Ellis & Berry, 2005). Ellis and Berry (2005) suggest that these discourses about school mathematics helped to define the boundaries for reform, as reforms that were implemented reflected these discourses, while those that failed to gain support and acceptance countered the discourses. In this sense, boundaries reflect and enact broader discourses about schooling, the purposes of education, and teaching and learning in the subject.

While researchers have found that discourses about schooling penetrate districts and shape district practice, this research has focused more on those related to accountability and standardization policies (e.g., Munter et al., 2023; Trujillo, 2013; Maguire et al., 2011), and less on discourses about the subject. This is reflective more generally of research taking a subject-neutral perspective (Burch & Spillane, 2003; 2005), despite arguments that educational leadership and policymaking are shaped by subject-matter differences (e.g., Grossman et al., 2004). Instructional leadership is assumed to cut across content areas. Leadership for mathematics, for example, would involve much of the same approaches and practices as that for English (Cunningham & Lochmiller, 2019; Rigby et al., 2021). This is problematic, as treating instruction as a generic enterprise oversimplifies the work of leadership and policy and obscures the ways these practices potentially differ by subject. Just as teachers' instruction is framed by the particular subjects they teach (Grossman & Stodolsky, 1994), "what policymakers know and believe about teaching the subject is likely to influence how they design and enact the policy" (Grossman et al., 2004, p. 13).

Then, moving away from viewing either district policymaking as singular in nature, a subject-specific understanding allows for consideration of the complexities of district policymaking and leadership in particular subject areas. Focusing on how the subject-matter acts as context (Grossman & Stodolsky, 1995) allows for an examination of the ways in which the unique histories, assumptions, and practices (i.e., discourses) of the subject organize and guide how districts and district leaders work to improve education in that subject. For example, attending to the *subject-matter context* can inform how and why school and district improvement strategies depend on the subject (Burch & Spillane, 2003; 2005). This subject-specific scholarship, while still emerging, has examined the nature of districts' improvement efforts, though has not considered the conceptual distinctions that demarcate between policies districts do and do not pursue—what I refer to as the boundaries of policy. Therefore, this dissertation investigated the ways discourses about school mathematics act as a context for how boundaries around mathematics education policy are framed in school districts.

Purpose

Much of the research on school districts has been under the banner of educational policy and leadership. While mathematics education researchers can learn much from this work, this scholarship often does not take a position on what counts as high-quality and equitable mathematics education (Cobb & Jackson, 2011). That is, though studies on education policy take mathematics as the background of their investigations, there tends to be a "limited understanding of the ideals and values of both mathematics educators and research mathematicians" (Ferrini-Mundy & Floden, 2007, p. 1274). As such, this study sought to bridge the research bases of educational policy and leadership and mathematics education, to study the mathematics-specific nature of district policymaking. This is important because "fundamental research about mathematics teaching and learning alone stands little chance of influencing teaching and learning on a broad scale unless some mathematics education experts become deeply engaged in the policy arena and produce research about policy" (Ferrini-Mundy & Floden, 2007, p. 1248).

Specifically, the main objective of this study was to examine how the unique assumptions, histories, and practices (i.e., discourses) of mathematics act as a context for district policymaking for mathematics education. That is, I considered how discourses about school mathematics construct a unique *mathematics subject-matter context*, and the ways this context was negotiated by district leaders to shape how districts establish *boundaries* around policies specifically for mathematics, to distinguish from other policies for other/all subjects. The three research questions that guided this study are listed below, followed by an overview of the study and its significance, as well as the organization of this dissertation.

Research Questions

1. What discourses about school mathematics construct the mathematics subject-matter context in school districts?
2. In what ways are the boundaries around policy for mathematics education framed in school districts?
3. How are boundary framings shaped by the mathematics subject-matter context?

Overview and Significance

To investigate the subject-specific nature of districts' policy boundaries, I conducted a comparative case study of two Missouri school districts. Through interviews with district leaders, observations of policymaking and leadership, and collection of relevant artifacts, I explored how discourses about school mathematics constructed each district's mathematics subject-matter context and shaped the ways in which boundaries around policy for mathematics education were framed. Within- and cross-case analysis revealed that districts' mathematics subject-matter contexts (SMC) were characterized by *dominant* discourses about mathematics as sequential (mastery of prior learning is necessary for future learning), well-defined (agreement over the content), and a core school subject, which were also reinforced by accountability discourses. In addition, districts' SMCs were characterized by *contested* discourses about mathematics pedagogy—between conceptually-oriented instruction and direct instruction focused on procedures—and equity—ranging from issues of access and achievement to identity. Attention to equity and high-quality mathematics instruction was prominent in the larger district, but, in the smaller district, issues of pedagogy were fairly absent, with "equity" deemed unacceptable by the local community. In the larger district, segmentation at the central office contributed to the contestation of discourses, where mathematics pedagogy discourses primarily emanated from the mathematics coordinators, and equity discourses from the equity department.

I found that the mathematics SMC shaped boundary framing through four mechanisms. First, dominant discourses (accountability, mathematics-as-core, sequential, and defined) were influential in constraining both districts' boundaries around policy for mathematics education to issues of achievement. Second, in the larger district, the SMC was negotiated by middle-level leaders (e.g., mathematics coordinators), where discourses about equity and mathematics pedagogy directed attention towards access and achievement in inquiry-oriented mathematics instruction. While these first two boundary framing mechanisms were with respect to policies for mathematics, the third and fourth mechanisms attended to subject-neutral policies, policies that ignore subject matter or treat subjects equally. Third, the SMC facilitated the crossing of subject-neutral policies that *directly* affect instruction into the mathematics boundary, where mathematics-as-core, sequential, and defined discourses prioritized mathematics over other subjects. Fourth, the SMC maintained the non-crossing of other subject-neutral policies—including equity-minded policies—through an absence of equity and pedagogy-related discourses that would necessitate a mathematics-specific form of the policy. So, some subject-neutral policies were occasionally implemented in mathematics-specific ways, but other subject-neutral policies never crossed into mathematics.

The results of my study reveal the mechanisms through which the subject-matter enters policymaking to constrain what is deemed as relevant (or not) to mathematics education. Moreover, by focusing on the mathematics-specific nature of district policymaking, this study informs policy enactment and how policy—even subject-neutral policies—might be sensitive to the school subject. So, in answering Posselt and colleagues' (2017) call for researchers to "see and expose the subtle boundaries that perpetuate inequities in other educational contexts" (p. 31), this study uncovers the mathematics-related discourses that constrained boundary framing, as well as the discourses that have the potential to reshape policy boundaries. This will support educational leaders and researchers to extend past the classroom walls and address the economic and political aspects involved in achieving ambitious and equitable mathematics education.

Organization of the Dissertation

In the following chapters, I describe my study in greater detail. Beginning with Chapter 2, I discuss the concepts and related literature that oriented my study, including issues related to policymaking in school districts, the subject-matter context and discourses about the subject, framing and boundaries, and place. In Chapter 3, I describe the methods by which I conducted the study, beginning with a description of my two case districts and the broader state and national policy contexts. Then, I describe my processes for data collection and analysis.

Chapters 4 and 5 provide detailed descriptions of each case, respectively, and the results of within-case analysis. The cases follow a similar structure where, organized by the research questions that guided this study, I discuss each district's mathematics subject-matter context, policy boundaries, and the relations between the two.

In Chapter 6, I discuss cross-case findings, where I highlight and explain themes and differences across the districts, especially in relation to the dominant and contested mathematics-specific discourses that characterized the districts' mathematics SMC, and the mechanisms by which those discourses shaped the framing of boundaries around policy for mathematics education. I also consider the implications of my findings for research in mathematics education and educational policy, as well as practical implications for K-12 school districts and leaders.

CHAPTER 2: LITERATURE REVIEW

This chapter begins with an overview of the concepts orienting my study, including policymaking in school districts, discourses about the subject, boundary framing, and place. With these constructs in mind, I then summarize literature on different discourses about school mathematics, and how districts and leaders enact those discourses in their leadership and policymaking. With respect to the latter, I specifically attend to the literature on problem framing, with a particular focus on boundary framing. The chapter concludes with a description of the purpose of my study, and how it builds upon the reviewed literature.

Conceptual Framings

To understand how the subject matters for district policymaking, I drew upon the concept of *subject-matter context* (Grossman et al., 2004). This concept allowed me to focus on the ways discourses about the subject are enacted by people, policies, and structures to guide and shape how districts work to improve mathematics education. Then, I applied the concept of *boundary* (Lamont & Molnár, 2002) to consider the conceptual distinctions that demarcate the policies that districts do and do not pursue for improving mathematics. Together, these two concepts oriented me to attending to the ways discourses about the subject, through the subject-matter context, shape how policies are framed as falling within or outside the boundaries of mathematics education. I also considered ideas about *place* to study how subject-matter contexts and boundaries might differ across school districts situated in different places and communities. Before addressing these ideas, because this study focuses on districts, I first consider issues related to policymaking in school districts.

Policymaking in School Districts

As described earlier, I conceptualize policy as both *text* and *discourse*, constituting the actual encoded text in documents, as well as the policy problems and solutions constructed through discourse (Ball, 1993). In addition to focusing on the ways discourse—language, and the practices, assumptions, and ideologies reflected in and enacted through language (Gee, 2014)—produces meanings through which some policy problems and solutions are made possible (Anderson & Holloway, 2018), policy-as-discourse also attends to the issues that are deemed unworthy, to consider "how the construction or representation of those issues limits what is talked about as possible or desirable, or as impossible or undesirable" (Bacchi, 2000, p. 49). This focus on discourse draws attention to the meaning-making involved in policy, by diverse actors across settings, in constructing how things should (or should not) be (Levinson et al., 2009).

Because policy is laden with meaning, scholarship on educational policymaking has moved from technical and rational perspectives that view decision-making as logical, to seeing policy as a product of interpretive and political processes. Policy problems (and solutions) do not exist as a fact; rather, policymakers deliberately portray bad conditions as problematic and amenable to policy action (Stone, 1989). Policymaking involves actors constructing what they understand to be the problem and how the intended solutions address that problem, and making local policies based on those understandings (Spillane, 1996; Spillane & Thompson, 1997). So, an interpretive and political perspective on school district policymaking sees policy as a social practice, with a focus on meaning-making and how contending interpretations of policy issues are negotiated (Levinson et al., 2009).

Attending to the interpretive or cognitive processes of policymaking, some scholars have focused on sensemaking, and how actors construct understandings and interpretations of information through their existing frameworks and worldviews (e.g., Coburn, 2006; Hill, 2001; Spillane, 2000). Meanings are situated and context-specific, where the spaces in which individuals (inter)act provide ideas (or, discourses) to draw upon, including: frameworks for acceptable action, norms and ideologies, and organizational practices (Evans, 2007; Trujillo, 2013; Turner, 2015). As such, this sensemaking process is shaped by interactions with colleagues and the contexts in which individuals work.

Organizationally, school districts, especially those with large central offices, are segmented, with division of responsibility among different groups of people and units (Spillane, 1998). Horizontally, policymaking is stretched and negotiated across different departments that work with little interaction. Vertically, those at the top of the hierarchy have more central decision-making authority than those more peripheral to the main lines of power (Coburn et al., 2009). Compared to senior district leaders (e.g., superintendents; chief academic officers; leaders of district departments), middle-level leaders (e.g., principals; district subject coordinators) occupy discursive spaces in which policies flow bidirectionally: middle leaders are responsible for enacting policy authorized by senior leaders, where successful enactment of those policies depend on classroom teachers (Ryan, 2007; Lipscombe et al., 2023). Understanding this segmentation is important because district leaders' sensemaking about policy is situated and mediated through their position and participation in the organizational structure (Turner, 2015). For example, Coburn and colleagues (2009) found that, in one district, leaders from the research office and those from the curriculum office had different views about high-quality assessment. They suggested that, though these differences likely stem from differences in their positions and disciplinary training, “they appeared to be sustained by a lack of ongoing interaction across divisions” (p. 1139).

In all these spaces, policymaking is happening, though the nature of this work differs. Levenson and colleagues (2009) offered a useful distinction: while authorized policies (like top-down policies mandated by senior district leaders) are backed by enforcement mechanisms, unauthorized or informal policies are developed more spontaneously, outside the offices that are charged with making such policies. In the enactment of authorized policy, actors, including middle leaders, interpret, interact with, and influence formal policy. As such, “rather than simply implemented,” “policies are interpreted and ‘translated’ by diverse policy actors” (Braun et al., 2010, p. 547). This policy *enactment* focuses on the “interaction and interconnection between diverse actors, texts, talk, technology and objects (artefacts) which constitute ongoing responses to policy” (Ball et al., 2012, p. 3)

Policy enactment is not closed to the workings within individual sites but is also shaped by interactions with external stakeholders (e.g., Dorner et al., 2022). For example, parents and community members establish limits on educational policy and restrict what is considered acceptable (McGivney & Moynihan, 1972; Oakes et al., 2005; Welner, 2001), where policies that are inconsistent with the discourses held by the community may be rejected or nullified (Trujillo, 2013). This highlights how policy not only addresses technical issues—e.g., changes in curriculum, routines, and practices—but also normative—ideologies about intelligence, the purposes of schooling—and political aspects of schooling—redistribution of power and resources (Oakes, 1992). In particular, in this study, I was interested in the normative assumptions and understandings (i.e., discourses) districts employ with respect to the subject in constructing problems and solutions, and enacting educational policies.

Discourses about the Subject and the Subject-Matter Context

School subjects differ in their histories, epistemologies, and relations to state and national policies. Grossman and Stodolsky (1994) argued that subjects vary on at least five dimensions: (1) whether the subject is considered "core" or "basic;" (2) degree of definition, or the extent to which there is agreement over the content, and how and to whom the subject should be taught; (3) scope, or the extent to which the subject is composed of multiple disciplines; (4) whether the subject is considered static and unchanging, or dynamic in its active production of new knowledge; and (5) degree of sequence, or the extent prior learning is perceived to be necessary for later learning. In school districts, discourses about these dimensions contribute to creating, for each subject area, a distinct *subject-matter context* (Grossman et al., 2004) that frames and organizes the practice of teachers and leaders. This subject-matter context acts as a filter for policy enactment by providing subject-specific meanings that individuals draw upon in their sensemaking and enactment of policy (more on this below).

Theoretically, the subject-matter context is a conceptual context that is socially constructed by discourses about the subject (Grossman & Stodolsky, 1995). Discourses, or what Ernest (2018) called "images," can be social or personal. Social discourses about the subject include representations from media (e.g., news; film) and schools (e.g., policy texts; curriculum materials; Maguire et al., 2011), and others' narratives about the subject. Personal discourses include cognitive and affective dimensions, and derive from past experiences with the subject, as well as exposure to social discourses (Ernest, 2018). Personal and social discourses, then, are interrelated, as personal discourses originate from social discourses, and social discourses are constructed from individuals drawing on and making public their own personal discourse.

Given differences in experiences, interests, and agendas across individuals and social groups, there is always *some* variation in discourses (Fairclough, 2015). This has two important implications for the subject-matter context (SMC). First, the SMC is individually interpreted, as actors negotiate their personal discourses with social discourses. That is, while the SMC is located within institutions—the common setting in which district leaders work—individuals may differ in their interpretations of the subject, as sensemaking is shaped by each person's preexisting frameworks and worldviews, as well as situated within their position and participation in the organizational structure (e.g., Spillane et al., 2002). For example, those with more power and positional authority (e.g., cabinet members and senior district leaders) may be less pressured than middle leaders by dominant social discourses, especially those that conflict with their personal discourses. These individuals, with the influence associated with their role, are also better positioned to authorize policies that enact certain discourses as dominant, therefore modifying the SMC.

Second, the SMC is constantly in flux and negotiated, as discourses compete for power to be established as *dominant*. By contrast to *dominated* discourses, dominant discourses are seen as natural and their ideological assumptions as commonsensical (Fairclough, 2015). So, while I theoretically view the mathematics SMC as a conceptual context constructed by and negotiated among a variety of discourses about the subject, I operationally characterize the SMC (more on this in Chapter 3) by its more dominant discourses. For Courtney and Mann (2020), dominant discourses enact influence on institutions by providing meaning to organizational practices and structures, where policy changes are unlikely to succeed if incompatible with the underlying discursive structure. This also suggests that successful policies are those that align with existing discourses.

Fairclough (2015) described this as a dialectical relationship, where discourse is simultaneously determined by and contributes to social structures (Fairclough, 2015). Likewise, policy and discourse mutually influence each other, where discourse both constructs and is mobilized by policy (Anderson & Holloway, 2018). With respect to the subject, the SMC enables and constrains practice by providing discourses about the subject that individuals draw upon in interpreting and making sense of policy issues. Discourses frame how policy is understood by making certain ways of knowing available and possible. As such, *dominant* discourses render some understandings and interpretations (of the subject) as taken-for-granted, and others nonsensical. While discourses provide individuals resources for sensemaking, individuals also reproduce or transform such discourses—and the subject-matter context more generally—through policy enactment (Burch & Spillane, 2003; 2005). That is, through discourse, people construct or “build” areas of “reality” (Gee, 2014), including practices, knowledge, and policies. Thus, mathematics education, “as something material, as a set of standardized and stable practices, generates and sustains the conception [or discourses] we have of it” (Lundin, 2012, p. 75), while also being derived from and reinforced by those discourses.

For example, tracking and "ability grouping" of students are simultaneously perpetuating *and* reproduced by discourses about the sequential nature of the discipline (Grossman & Stodolsky, 1994). These discourses about the subject are employed by individuals in their sensemaking and construction of policy problems and solutions for mathematics education, which may differ from the discourses available in the subject-matter context at another district that does not engage in tracking practices. District leaders, then, not only encounter discourses about school mathematics, via the mathematics subject-matter context, in their interaction with people, policy, and structures, but also draw upon such discourses in their policy enactments. In particular, the subject-matter context shapes how districts *frame* policy with respect to the subject (Grossman et al., 2004).

Frames and Boundaries

Frames assign meaning to an event by giving an answer to the question "What is it that is going on here?" (Goffman, 1974). From this perspective, frames guide and organize meaning by bracketing information and focusing attention. Social movement and collective action scholars have since borrowed this concept to consider how frames are also deployed strategically to mobilize support and influence people (Benford & Snow, 1988). Then, as a discursive act, framing means "to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (Entman, 1993, p. 52). In particular, actors engage in *diagnostic* framing—defining problems and casting particular individuals or situations as responsible—and *prognostic* framing—offering potential solutions to a problem (Snow &

Benford, 1988)[1]. How a problem is framed is important because it assigns responsibility (Stone, 1989) and legitimizes some solutions and not others (Benford & Snow, 2000).

In constructing solvable problems, actors simultaneously engage in *boundary framing* (Silver, 1997), or boundary work (Gieryn, 1983), to construct symbolic boundaries. Symbolic boundaries are "conceptual distinctions made by social actors to categorize objects, people, practices" (Lamont & Molnár, 2002, p.168). Categorizing identifies "things as a *this* but not a *that*" (van Hulst & Yanow, 2016, p. 99, quotations in original where italicized), which establishes differences between groups and creates "in-group/out-group distinctions "(Silver, 1997, p. 488). Symbolic boundaries can be framed to define and differentiate, for example, academic disciplines (e.g., Beddoes, 2014), professions (e.g., Burri, 2008), or food cuisines (e.g., Rao et al., 2005; Kaplan & Radin, 2011).

Not only do boundaries define and distinguish groups from one another, they also act as a medium through which individuals and organizations acquire status and resources associated with being a member of a certain group (Lamont & Molnár, 2002). With respect to the boundary work of fields and organizations, for example, boundaries are employed strategically to protect professional autonomy, as well as claim authority and jurisdiction over a contested territory (Burri, 2008; Grodal, 2018; Kaplan & Radin, 2011). In education, boundaries can determine a subject's position in the curriculum. For example, in the English debate over the development of environmental education as a school subject, opponents against argued that it overlapped with the existing geography

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[1] According to Snow and Benford (1988), actors also engage in motivational framing, or providing a rationale for action. Because this framing task is concerned with motivating participation, rather than defining problems and solutions, I do not attend to motivational framing in this study.

curriculum (Goodson, 2011). As another example, in one study, teachers framed the boundaries of parental engagement in ways that included families, but maintained their own power and authority (Durand & Secakusuma, 2019). In delineating between groups—between teachers and parents, or geography and environmental education—boundaries act as a mechanism for social exclusion, which can reproduce inequity (Lamont, 1992). As such, boundary shifting—the expansion or contraction of boundaries—is both a strategy and a goal (Cherry, 2010) for creating access and inclusion (Posselt et al., 2017).

In this study, I am interested in how ideas about the boundaries of fields and organizations, and their use in education research to date, might be applicable to school district boundaries for subject-specific policy. Specifically, I am interested in how school districts construct policy boundaries that categorize policy problems and solutions that are specifically for mathematics education, and differentiate it from problems and solutions for other/all subjects. Here, it is important to clarify the distinction between boundary framing and diagnostic and prognostic framing. While the latter two attend to the causes (diagnostic) and solutions (prognostic) of problems, the former foregrounds the conceptual distinctions that demarcate "mathematics education" problems and solutions from "non-mathematics education" problems and solutions. Because it is the "boundary that defines the group, not the cultural stuff that it encloses" (Barth, 1969, p. 15), my study foregrounds the boundaries around mathematics education, rather than the problems and solutions enclosed inside (though, I do attend to diagnostic and prognostic frames as these help identify the boundaries).

In school districts engaged in equity efforts, for example, boundaries determine whether such issues are, in part, under the domain and authority of mathematics education. For equity to fall outside the boundaries suggests that those seeking to improve mathematics education have little control and authority over how such equity initiatives would be implemented in schools, particularly in mathematics. This is important because, to achieve the field's vision of ambitious and equitable mathematics teaching, schools and districts will likely have to engage with and design for equity in mathematics (Cobb et al., 2020; Horn & Garner, 2022). Even if equity was being pursued in education more generally, because such efforts will likely be implemented in mathematics differently than expected due to the interaction between subject-matter and policy (Grossman et al., 2004), it matters whether equity initiatives are designed specifically for mathematics.

Though boundaries are divides that separate people, objects, and places, they are also "located inside individual minds, expressed through values, beliefs, ways of knowing that people develop through daily interactions" (Yeh et al., 2021, p. 198). So, boundaries around mathematics education policy are constructed and established through discourse, especially those specific to the subject. This is because "how we define mathematics determines what we might include/exclude" (Thanheiser, 2023) as policies *for* mathematics. As explained earlier, discourses about the subject are personal and social, reinforced and encoded in policy texts, structures, and routines, and they interact to shape policy enactment. Therefore, this study seeks to understand how discourses about school mathematics shape the framing of policy boundaries, revealing not only how policymaking differs across school subjects, but also the ways in which boundaries might be reshaped to improve mathematics education.

Place

It is likely that subject-matter contexts, and the ways such contexts shape boundary work, vary by place. Places are geographically *located* (Agnew, 1987), and these locations differ in access to opportunities and resources important for teaching and learning (Cobb, 2020). These resources are material, such as access to quality teachers (e.g., Jaramillo, 2012), as well as discursive. As an example of the latter, many charter schools, a hallmark of urban education reform, reflect a “no-excuses approach” (Carr, 2013) that socialize students into mathematics (Tate et al., 2018). While places “can be charted with mathematical precision as a series of sites or locations” (Gruenewald, 2003, p. 622), they are also “spaces which people have made meaningful” (Cresswell, 2004, p. 132). This *sense of place* (Agnew, 1987; Pred, 1983) is subjective, and includes the relationships and meanings people attach to place. As a product of the values and ideas (or discourses) of individuals inhabiting a particular place, sense of place imposes upon people a view of what is natural and acceptable (Gruenewald, 2003). Because of variation in discourses across places, it is possible that districts differ in their mathematics subject-matter context.

These differences related to place matter for policymaking and implementation (e.g., Honig, 2006). For example, scholars have documented how the “new math” reforms that began in the 1960s developed in different ways across countries (Davison & Mitchell, 2008, p. 147), and this was a reflection of how “each country has a unique school mathematics—a product of its history, culture, and traditions, and conforming to its social, political, and educational systems" (Kilpatrick, 2012, p. 569). In other words, differences in mathematics subject-matter contexts across countries (i.e., each country's "unique school mathematics") manifested in different ways of responding to and implementing the new math reforms.

In particular, place shapes how people and organizations (e.g., school districts) frame boundaries (e.g., Cherry, 2016). Recent debates regarding equity in schools, for example, suggests that whether and how equity falls within the boundaries of mathematics education varies by place. In 2022, the Florida Department of Education rejected dozens of mathematics textbooks for their perceived inclusion of critical race theory and social emotional learning topics (Goldstein & Saul, 2022). By contrast, in California, a recently proposed version of the updated mathematic curriculum framework recommended that tracking be eliminated in middle schools, and that data science be offered as an alternative to calculus (Hong, 2021). Compared to Florida, California's boundaries for mathematics education were more expansive, with greater latitude for equity-minded efforts to fall inside. So, these boundaries have very real consequences, and by understanding how they are defined across places can reveal how we can expand boundaries to improve mathematics education.

But even within states, individual organizations, like school districts, also differ by place, and these differences shape policymaking. Not only do external stakeholders like families and community members offer up different discourses for negotiation, but districts are also organized differently, and this has implications for the social discourses with which individual actors within the district interact. Attending to the different places in which different school districts are situated can reveal how policy enactment, especially for mathematics education, unfolds in particular places. This will support educational leaders and researchers in reshaping policy boundaries in specific places, and across places.

Summary

This study focused on district policymaking, which is understood to be a product of interpretive and political processes shaped by the organizational structure of the district, and external stakeholders. Policy is not just authorized, but continually enacted, as individuals interpret, make sense of, and translate policies through their personal discourses, as well as social discourses encountered from people, policies, and structures. In attending to discourses, I focus on discourses about the subject, and how they construct a subject-matter context that frames and organizes how districts and district leaders make sense of the subject, and therefore, enact policies for that subject. Specifically, I focus on policy boundaries for mathematics education, the conceptual distinctions that demarcate the problems and solutions districts pursue for mathematics from other problems and solutions. As a discursive social practice, policy enactment is shaped by local contexts, so my study also attends to place and how boundary work for mathematics education policy unfolds in particular places.

Discourses about School Mathematics

Discourses about school subjects emanate from various sources, including the parent discipline, the practices and traditions of the school subject, and the views and assumptions individuals have about teaching and learning in that subject (Grossman et al., 2004). As described previously, subjects vary according to five dimensions: (1) whether the subject is considered core or basic; (2) degree of definition; (3) scope; (4)

whether the subject is considered static or dynamic; and (5) degree of sequence (Grossman & Stodolsky, 1994). These dimensions are related to the epistemology of the subject, and have implications for equity. Because these discourses shape district leaders' sensemaking and enactment of policy, in the following subsections, I review the discourses related to each of these dimensions. For analytical purposes, I discuss the mathematics-specific discourses separately, but they, of course, interact with one another. Likewise, though I consider equity for each dimension, I also address equity discourses separately in order to foreground the implications they have for how districts and district leaders make sense of mathematics, and therefore how they work to support and improve education for mathematics.

School Mathematics as Core

Mathematics is considered a *core* school subject, in part, because mathematical knowledge is viewed as "good," "beneficial," "useful," "important," and "necessary" (Lundin, 2012). Such high-status allows mathematics to garner and claim more resources than lower status subjects, including greater graduation requirements and allocation of time (Grossman & Stodolsky, 1995; Grossman et al., 2004; Spillane, 2005). Historically, mathematics' importance derived from its supposed capacity for developing "mental discipline" (Stanic, 1987). That is, through learning mathematics, people learn how to reason and think logically, skills of which could be transferred to other contexts (Grossman & Stodolsky, 1994). However, with the rise of industrialization, vocationalism, and expanded student enrollment in the early 1900s, mental training gave way to calls for the functional and practical uses of mathematics (Kliebard, 2005), including solving everyday problems and preparing students for their role in a capitalist economy. This shift resulted in differentiated coursework for students based on their perceived ability and predetermined social role (Kliebard & Franklin, 2003). Such calls for usefulness further intensified in times of perceived crisis, such as during the World Wars, the technological race of the Cold War, and economic crises (e.g., *A Nation at Risk*; Schoenfeld, 2004).

More recently, mathematics derives its high status from its socioeconomic utility (Apple, 1992). With mathematics' increasing role in science and the economy, scholars have framed opportunities for learning mathematics in terms of civil rights (Schoenfeld, 2002; Moses & Cobb, 2001), emphasizing that "the ongoing struggle for citizenship and equality for minority people is now linked to an issue of math and science literacy" (Moses, 1994, p. 107). In such arguments, mathematics is not only characterized as affording social and economic progress, but is linked to the health of a democracy (Popkewitz, 2004). These discourses about the value of mathematical knowledge have been consistently employed in policy documents. NCTM's (1989) *Standards,* for example, focused on "new social goals for education includ[ing] (1) mathematically literate workers, (2) lifelong learning, (3) opportunity for all, and (4) an informed electorate" (p. 3). Each of these goals reflects discourses about the importance of mathematics, whether for practical or national use, mental fitness, or democracy. Similarly, such discourses were reflected in the Conference Board of the Mathematical Sciences (2014)'s statement of support for the Common Core State Standards, arguing that these standards call for the mathematical knowledge required for elevating "every young American to levels competitive with the best of the world, of preparing our college entrants to undertake advanced work in the mathematical sciences, and of readying the next generation for the jobs their world will demand."

Providing quality mathematics education "for all" students, however, is in tension with accreditation practices that posit mathematics as a scarce, economically valuable resource (Pais, 2014; Straehler-Pohl & Pais, 2014). That is, school mathematics, through testing and grading practices, selects and certifies only *some* students with mathematical competence that can be traded for other credit (e.g., college credit; future job). Here, the economic value of mathematics necessarily requires exclusion, as the value of those who fail is appropriated by those who pass. These accreditation and exclusion mechanisms have been reinforced by neoliberalism in education. Under calls for free-market capitalism and economic efficiency, the neoliberal agenda has promoted curricular standardization and high-stakes accountability as "weapons" for improving achievement and closing the "achievement gap" (McDermott, 2013), which has been particularly amplified in mathematics education through discourses about the importance of mathematical knowledge for the economy and national security (Martin, 2013). Schools and districts have responded to such discourses by, for example, emphasizing tested subjects (Dee et al., 2014), pushing low-performing students out of school (Heilig et al., 2012), and focusing on the "performativity" of students, teachers, and school leaders (Waitoller & Kozleski, 2015). Such practices, however, are harmful, as they sort and label children, and limit the opportunities of those labeled "failures" (Ernest, 2018). Thus, the importance of mathematics, according to Pais (2012; 2013), derives not from its internal properties and applications (e.g., mental discipline; everyday utility), but rather from the role mathematics plays in exclusion and accreditation within capitalist society.

While these discourses may not be explicitly written in district policy texts and language, it is possible, and likely, that they are enacted in practices, via sorting (e.g., tracking) and accreditation (e.g., grading and testing).

School Mathematics as Defined, Static, and Homogenous in Scope

There are also epistemological differences among school subjects, including what Grossman and Stodolsky (1994) refer to as the definition and scope of a subject, and whether the subject is static or dynamic. Here, I address these three dimensions together as discourses about them overlap and reinforce one another. Compared to other subjects, school mathematics is considered relatively well *defined*, including its widely-accepted and agreed upon body of knowledge and the clear boundary between mathematics and other subjects (Grossman & Stodolsky, 1994). For Siskin (1995), teachers generally agree on “what counts as knowledge and how it is organized and produced” (p. 170). That there is some sort of “truth content of mathematics” (Rowlands & Carson, 2002, p. 98) stems, in part, from the focus of mathematical proficiency on abstraction, versus its contextual or culturally-based applications (Thanheiser, 2023). Separated from context and confined to the four walls of the classroom, mathematics is seen as “neutral,” with the same mathematical rules and procedures universally applied (Pais, 2011). This legitimizes high-stakes testing as a valid and reliable way to measure students and their mathematical intelligence (Yeh et al., 2021), which abstracts and translates the work of teaching and learning to “objective” and “transparent” numbers (e.g., test scores; Taubman, 2010).

A subject’s definition is related to its *scope*. Unlike social studies, for example, which draws from history, anthropology, economics, and political science, school mathematics is homogenous in scope, primarily composed from one parent discipline

(Grossman & Stodolsky, 1994). Scope also has implications for the *static* and unchanging nature of the subject. Compared to English or social studies, school mathematics is less affected by active production of new knowledge and theoretical perspectives in the parent discipline, and therefore experiences less change in subject-matter content, instructional approaches, and curricular goals (Stodolsky & Grossman, 1995). In schools and districts, scholars have found that such discourses have been reflected in a more standardized curriculum, with more pressure to cover content and less control over curriculum for teachers (Siskin, 1994; Stodolsky & Grossman, 1995).

Reforms in mathematics education, however, reveal disagreements over the nature of mathematical knowledge, and how and to whom mathematics should be taught. For example, in an attempt to disrupt dominant discourses about school mathematics, the "new math" of the 1960s sought to promote mathematics instruction that focused on conceptual understanding, as well as teaching that engaged students in discovering, for themselves, important mathematics concepts (Fey & Graeber, 2003). The 1970s, however, witnessed the "back to basics" era, a backlash that instead emphasized the development of skills through teacher demonstration and student practice. This response stemmed from arguments that "new math" failed, as well as critiques about the apparent loss of traditional values in the new approaches to mathematics education (Fey & Graeber, 2003). Concerned about this public perception of mathematics, NCTM leaders published a series of position papers, starting in 1980 with *An Agenda for Action* and later in 1989 with *Standards* (McLeod, 2003). Reflecting a constructivist view of mathematical learning, *Standards* called for problem solving and inquiry, and catalyzed a series of National Science Foundation (NSF)-funded "reform," "standards-based" curricular programs (Schoenfeld, 2004). As before, backlash ensued, erupting in the "math wars" of the 1990s and early 2000s, where the NSF-sponsored "reform" was pitted against the "traditional" curriculum, which emphasized skills and procedures and direct instruction.

These competing discourses about the epistemological nature of school mathematics have implications for pedagogy. While these pedagogical discourses more directly stem from how the subject is defined, the debates that exist among them also draw from discourses about the static nature and homogenous scope of school mathematics. Specifically, the different perspectives on mathematics curriculum previously outlined have parallels to different models of mathematics instruction that are also often pitted against each other, whether as vague notions of "reform" and "traditional" mathematics instruction or as more clearly specified approaches, such as "dialogic" and "direct" instruction (Munter et al., 2015). Briefly, the direct instruction model consists of the teacher demonstrating how to complete a problem type, followed by phases of guided and independent practice along with corrective feedback (Cobb et al., 1992). By contrast, in more inquiry-based *pedagogies of investigation* (Nicol, 1999), students are provided opportunities to wrestle with big mathematical ideas (Hiebert & Grouws, 2007) through engaging in cognitively demanding tasks (Stein & Lane, 1996) and participating in discussions about their mathematical thinking (Stein et al., 2008). Underlying these pedagogical differences are differences in perspectives about what it means to know and do mathematics, which also has implications for who is good at mathematics. While the direct instruction model emphasizes precision and fluency with symbolic representations (Munter et al., 2015), inquiry-based instruction views knowing and doing mathematics as including developing mathematical authority and engaging in mathematical practices, like communicating and authoring and justifying mathematical conjectures (Boaler, 2008).

In addition, these instructional models raise different implications for issues of equity. Proponents argue that inquiry-based instruction increases access and opportunity, particularly for students who have been historically excluded from such opportunities, to discover and make sense of mathematics, as well as take up positive identities as learners and doers of mathematics (Boaler & Staples, 2008; Louie, 2017). In prioritizing sensemaking, communication, and problem-solving over speed and rote-practice, inquiry-based instruction challenges narrow conceptions of mathematical activity and narratives about who is (and is not) good at mathematics (Horn, 2012; Martin, 2009; Shah, 2017). On the other hand, advocates of direct instruction argue that this instructional approach is useful for differentiation (Tomlinson, 2014), and can support the mathematics achievement of students experiencing mathematics difficulty (Baker et al., 2002; Kroesbergen & Van Luit, 2003). Such teaching, however, is predicated on deficit assumptions about students and their families (Bannister, 2016), and deprives students access to problem-solving and inquiry-based learning, despite evidence of such approaches for students with exceptionalities (e.g., Baroody, 2011). Moreover, some have argued that neither of these approaches attend to more critical issues of equity, including social justice and how mathematics connects to students' experiences (Rubel, 2017).

Despite the prevalence of competing discourses about mathematics curriculum and pedagogy, and decades of reform efforts, mathematics teaching and learning has changed little over the past century. "Presenting definitions and rules, demonstrating solution procedures on sample problems, and then asking students to practice the procedures on similar problems" (Hiebert, 2013, p. 45) continues to be the primary mode of mathematics teaching in U.S. classrooms. So, despite a lack of public consensus regarding mathematics content and how it should be taught, the nature of mathematics teaching and learning in classrooms has largely remained static and unchanged.

School Mathematics as Sequential

Unlike most other subjects, mathematics is considered inherently linear and sequential, so that learning the subject requires students to master prerequisite skills and concepts before learning new topics (Stodolsky & Grossman, 1992; 1995). When mathematics is seen as an "ordered progression from place to place through a sequence of steps" (Siskin, 1994, p. 179), mathematical learning is seen as incremental and progressing from simple to complex topics (Darby, 2006). In schools and districts, these discourses are reflected in curriculum alignment among teachers and tracking and ability grouping practices, where students who are "perceived as less ready" (p. 187) are placed in separate courses that provide for additional time, repetition, and practice (Grossman & Stodolsky, 1994).

Tracking, and the sequentially of mathematics, has a long history, dating to at least the early 1900s where there was a large increase in high school enrollment. During this time, there was a shift in the purpose of the high school mathematics curriculum from mental discipline to practical use, which was, in part, due to beliefs that traditional or academic mathematics classes were not necessary for all students. Given the now wide range of backgrounds, interests, and "abilities" among the student population, college preparatory courses seemed inappropriate. Instead, the purpose of high schools expanded to include “the preparation of all students for virtually all aspects of life” (Garrett & Davis, 2003, p. 494). This resulted in a bifurcation of the high school curriculum, with a traditional college preparatory track (primarily for white, middle-class males), and another track with vocational courses exclusively focused on preparing students for their (working class) jobs and daily responsibilities (Kliebard & Franklin, 2003). Because of segregation, educational opportunities for Black children were limited, with the number of Black high schools less than one tenth of those serving white students (Rury, 2020). Even when high schools were available for Black youth, vocational education dominated coursework, with few opportunities for academic classes.

Oakes and colleagues (1997) argued that tracking is reinforced by prevailing norms about race and class that interact with fixed conceptions of intelligence to maintain racial sorting and segregation. As such, debates over de-tracking may explicitly center issues of curriculum or instruction, but are normatively and politically about the meaning of intelligence, and who has it. In mathematics specifically, the tracking and sorting of students—maintained by discourses about the sequentially of mathematics—perpetuates a racial hierarchy of mathematics ability that positions Black, Latinx, and Native Americans as intellectually inferior to white and Asian Americans (Martin, 2009). Intersecting with discourses about race are also those related to gender and class. In particular, the “White male math myth” (Stinson, 2013) reinforces that mathematics is a discipline in which the successful are white, middle-class males. Such fixed and hierarchical conceptions of mathematical competence are reinforced by discourses about mathematics as sequential, because some students are “high”, and others are “low.” These discourses have likely intensified in recent decades with neoliberal pushes for accountability and standardization. For example, calls for content standards and measures of proficiency have produced language for ranking children (e.g., “on track,” “behind”) on a seemingly objective path through which mathematical learning progresses, from “basic” to “advanced” (Adiredja & Louie, 2020).

Equity in School Mathematics

Equity in school mathematics has traditionally been conceptualized as *access*, or “the tangible resources that students have available to participate in mathematics” (Gutiérrez, 2012, p. 19). Calls for access have been present since at least the early 1900s with the rise of high school enrollments. As alluded to previously, access at that time was with respect to differentiation and the opportunity to participate in vocational courses that would prepare students for their future jobs, as traditional mathematics courses did not attend “to the needs of a new population of secondary students” (Kliebard & Franklin, 2003, p. 402). A similar discourse was also reflected during the Sputnik Era with the passage of the National Defense Education Act (NDEA). In prioritizing “excellence” in mathematics, along with science and foreign languages, NDEA called for the ability grouping of students and testing programs that would identify the most academically “gifted” students (Gamson, 2007). Educational leaders undertook these initiatives ostensibly in the name of equity, for “by providing students with *distinct kinds of educational opportunities*, they believed they were offering *more equitable opportunities*” (Gamson, 2007, p. 179, italics in original). However, in promoting tracking as a means for providing advanced academic opportunities for “gifted” students, NDEA relegated “nongifted” students, who made up the majority of children, to remedial and general mathematics courses that inhibit educational opportunity. These tracking practices were rationalized with discourses that children possess differences in intellectual ability, which continue to remain prevalent in mathematics education today, often under the guise of "differentiation" or "meeting student's needs" (Nguyen & Munter, 2023). It is important to note here that the mathematics reforms of the 1960s were never for Black students, and other oppressed populations: while several new efforts and programs worked to enlist the most gifted white male students, Black students faced racism and oppression in the context of Jim Crow segregation (Martin, 2019).

More recently, with the "opportunity for all" push in the NCTM's (1989) *Standards*, there has been an increased focus on providing all students access to a rigorous curriculum. Scholars have, however, criticized the notion of "math for all" for promoting colorblindness (Martin, 2013), marginalizing the needs of traditionally underserved students (Martin, 2003), and ignoring the social, economic, and political contexts in which mathematics teaching and learning are situated (Apple, 1992). Despite decades of efforts focused on access, inequities in achievement continue to persist. While *achievement*—in terms of course taking patterns, standardized test scores, and participation in the mathematics pipeline (e.g., mathematics-related college major and career; Gutiérrez, 2012)—is important because of the socioeconomic utility associated with mathematical knowledge, discourses focused on achievement "gaps" contributes to deficit-based narratives (Carey, 2014) that frame historically marginalized students groups as "underperforming" (Gutiérrez, 2008) and as the causes of academic failure (Valencia, 2010). Accountability's "apparent objectivity of quantification lends an aura of fairness" (Taubman, 2010, p. 6) that maintains and legitimizes the "achievement gap" racial discourse (Carey, 2014) and the "gap-gazing fetish" (Gutiérrez, 2008) in research, which reinforces narrow views of what counts as mathematical competence—typically centered on procedures and rote memorization—and devalues the out-of-school knowledge students possess (Louie, 2017).

Some scholars have argued for broader notions of equity beyond access and achievement, including fostering students' mathematical identities (Aguirre et al., 2013), supporting students to draw on their funds of knowledge (Civil, 2007), providing opportunities for students to "see themselves in the curriculum" and see mathematics as "meaningful to their lives" (Gutiérrez, 2012, p. 20), and engaging students in using mathematics to explore sociopolitical issues (Frankenstein, 1990; Gutstein, 2016). These efforts are encompassed in what Gutiérrez (2012) calls the "critical" dimensions of equity, particularly, issues of *identity* and *power*. Addressing these critical dimensions in mathematics teaching is challenging, however. Not only are the practices associated with access and achievement viewed as more applicable to daily instruction, but engaging in the critical dimensions of equity also requires viewing mathematics as a social, cultural, and political endeavor (Rubel, 2017). Blurring these boundaries between cultural and mathematical knowledge (Nasir et al., 2008) necessarily requires challenging commonly held assumptions of mathematics as well-defined, objective, and universal.

Though there has been some progress in integrating equity into the conceptions (and practices of) school mathematics, there continues to be a decades-long debate about the extent to which sociopolitical issues are relevant to mathematics education (Confrey, 2010; Heid, 2010; Martin et al., 2010). Louie and Zhan (2022) argued that "the equity limb does not grow at a distinct angle from other limbs of the mathematics education research tree; rather, these limbs can, should, and sometimes do intertwine and mutually support one another" (p. 365). In wondering whether there might be "something special about this limb," Matthews and colleagues (2022) asked "does the equity limb, in fact, grow at a distinct angle?" (p. 346). As such, there are still lingering questions regarding the relation between equity and mathematical content in mathematics education.

Summary

The research discussed in this section synthesized the different discourses about school mathematics that may be circulating for districts and leaders to draw upon in their sensemaking and enactment of policy. Specifically, these discourses include those related to mathematics' core function, clear definition, homogenous scope, static nature, and sequentiality. Discourses related to the epistemology of school mathematics have implications for how and to whom mathematics should be taught, reflecting and reinforcing particular conceptions of pedagogy and equity. Regarding the latter, discourses about equity in school mathematics include dominant notions of access and achievement, as well as more critical dimensions of identity and power. As described earlier, these discourses contribute to constructing a mathematics subject-matter context in school districts, framing and organizing how districts work to support and improve mathematics education. I turn to literature related to this subject-specific nature of leadership and policymaking in the following section.

Discourses about the Subject and District Leadership and Policymaking

Though scholars have argued that, rather than being generic, leadership and policymaking depend on the subject-matter (e.g., Stein & D'Amico, 2000; Wenner & Campbell, 2017), there has been relatively little research that takes a subject-specific view (Cunningham & Lochmiller, 2019). One line of research that does attend to the subject explores how discourses about the subject shape teachers' and leaders' practice (Grossman & Stodolsky, 1995). Because most of this research has been with respect to teachers and their instruction (e.g., Coburn, 2004; Stodolsky & Grossman, 1995), I therefore focus primarily on the work of one group of scholars—Burch, Spillane, and their colleagues—who have attended to school and district leadership. Then, I review research with respect to discourses and policymaking.

Comparing leadership strategies in mathematics and literacy, Burch and Spillane (2003) found that school leaders enacted different discourses about the subject and that this was reflected in their strategies for reform. Specifically, school leaders employed discourses about mathematics as a defined body of knowledge in enacting more sequenced programs of study. By contrast, discourses about literacy as a subject that involves all disciplines were reflected in the school's approach to curriculum development, which engaged all teachers, and not just those teaching reading and writing. Other mathematics-specific discourses that shaped leaders' reform strategies included: mathematics as core to the curriculum; that skills should be taught in a particular sequence; and the external community (e.g., national organizations; curriculum materials), rather than the school, has primary expertise for reform (Burch & Spillane, 2003). Burch and Spillane (2005) found similar patterns in their study of subject-matter and district leadership.

The subject-matter context also shapes how schools and districts organize for instructional leadership. Burch and Spillane found that leaders' discourses about the importance of reading and mathematics were reflected in their prioritization of these subjects in the number of formal leaders responsible for these subjects (e.g., mathematics instructional coach), as well as curriculum and accountability (Burch & Spillane, 2003; Spillane, 2005). In addition, discourses about literacy pervading the entire curriculum and expertise for literacy residing in the school—compared to discourses about mathematics as a stand-alone subject and expertise residing in the external community (Spillane, 2005)—were reflected in a more widely dispersed leadership structure for literacy involving both formal and informal leaders (Spillane & Kim, 2012; Spillane & Hopkins, 2013). Not only were there more participants and participation in literacy than in mathematics, the nature of participation in the former was more collaborative and sophisticated in nature (Sherer, 2004).

The research reviewed in this section thus far has primarily attended to leaders' own discourses, that is, their personal discourses. As discussed previously, leaders also encounter social discourses—from others, news, policy texts, etc.—and these interact with personal discourses to shape policy interpretation and enactment. For example, Spillane (2000) found that, in interpreting state and national mathematics reforms, district leaders often attended to language that was familiar to them, focusing on the form rather than the epistemological and pedagogical functions (e.g., attending to the use of manipulatives rather than the goals of sensemaking and reasoning). Similarly, Hill (2001) found that school leaders' interpretations of state standards differed significantly than what was intended, even though leaders used the same or similar language. In fact, school leaders used language that matched their textbook, and did not perceive that the same language used by their textbooks and the state standards connoted different meanings. While Spillane's (2000) findings primarily concerned the policy features that leaders attended to in relation to their own knowledge, Hill (2001) extended this by finding that leaders' interpretations also reflected the discourses from their local contexts: in this case, available curricular materials. That is, leaders' sensemaking of policy aligned with their personal discourses and the social discourses available in their organizational contexts.

As alluded to, an important source through which school and district leaders encounter social discourses are broader state and national policies. For example, Burch and Spillane (2003) found that leaders confront discourses about which subjects are core through standardized testing policies. Some scholars have described this as policy's function as discourse (Bacchi, 2000; Ball, 1993), where policy is framed as a discourse that constructs people and objects. For example, in the educational context, policies produce subject positions for the "good" teacher and the "good" student (Bulkley & Gottlieb, 2017; Dorner et al., 2021). These broader policy discourses make their way into schools and get encoded in and perpetuated through school policy documents, websites, posters, and even in how schools are built and organized (Maguire et al., 2011). The effects of policy as discourse are the limits and constraints on what is possible and imaginable (Ball, 1993). Accountability policies, for example, produce discourses of the good school as one that is always improving and achieving at appropriate levels (Maguire et al., 2015), constraining district policymaking to those focused on results, rather than, say, relevance or student-centered teaching (Trujillo, 2013). High-stakes testing policies have also produced subject hierarchies with mathematics (and English) occupying the top position, limiting school policies to those that prioritize tested subjects over a comprehensive education (Lynch & McGarr, 2016).

Of most interest to this study is how, in imposing limits on what is possible, discourses (about the subject) constrain which problems and solutions are deemed as relevant (or not) to mathematics education. Then, rather than schools and districts responding to problems that exist "out there" (Stone, 1989), problems are created through discourse. That is, discourse constructs the political terrain that constitute which issues are to be considered. Such construction of policy problems, or problem framing, is the focus of this study. I turn to this next.

Problem Framing

As described in the previous section, leaders and districts take up and enact discourses in their policymaking. One key way that researchers have explored this is how discourses shape the *framing* of policy problems. An important theme in this literature has been the influence of standardized assessments on the identification of problems. For example, investigating the impact of the Trends in International Mathematics and Science Study (TIMSS) on Israeli mathematics education policy, Feniger (2018) found that discourses about quantitative indicators like TIMSS penetrated policymakers' framing, resulting in a "tunnel-vision effect" that emphasized such measures over broader educational aims. This tunnel-vision effect is especially salient in mathematics given the increased presence of accountability discourses and discourses about the importance of the subject (e.g., Burch & Spillane, 2005). Indeed, in their investigation of how districts across the U.S. state of Missouri framed mathematics-related problems, Munter and colleagues (2023) found that most districts identified outcomes-related problems, as opposed to those related to issues of equity or student experiences.

Another important theme is the role of the subject-matter in problem framing. In one urban school district, Jackson et al., (2018) found that, for the problem of low outcomes on state mathematics assessments, leaders in the curriculum and instruction office framed the problem in terms of improving instruction through supporting teacher learning, while those in the leadership office framed the problem in terms of reconfiguring material and human resources. That leaders in both offices identified the same problem but differed in their framing suggests that differences might be, in part, attributable to the departmentalized nature of the district and how the subject-matter is differently implicated across departments (teacher support versus supervision of principals). Similarly, Munter et al. (2023) found that leaders from districts that employed a mathematics-specific leader, or districts committed to inquiry-based pedagogy, were more likely to identify problems related to issues of equity or student experiences. These studies point to a potential interaction between leaders' problem framing and their discourses about mathematics, though neither empirically investigated that possibility.

Other researchers, however, have more explicitly analyzed how leaders enacted discourses about the subject in their framing of problems (e.g., Burch & Spillane, 2005). For example, Coburn and colleagues (2009) found that leaders who viewed high-quality mathematics instruction as direct instruction of basic skills framed the problem of low test scores as limitations of the curriculum, which was focused on conceptual understanding. By contrast, those who viewed high-quality instruction as supporting students to construct their own mathematical understanding framed the problem in terms of teachers' implementation of the curriculum. Here, different discourses about mathematics pedagogy were connected to differences in problem framing, which was similar to Munter et al.'s (2023) finding that leaders from districts committed to inquiry-based instruction identified different problems than districts whose leaders did not express similar pedagogical commitments. In fact, Coburn et al., (2009) found that discourses about the subject played an important role in the framing of most district-level decisions related to instruction.

By contrast, others have found that leaders frame improvement problems in ways that do not require subject area expertise, such as hiring staff, securing external professional development, and adopting well-defined curricular materials to guide mathematics initiatives (Lochmiller & Acker-Chocevar, 2016; Stein & D'Amico, 2000). Though this research examined knowledge about the subject, rather than discourses, the findings potentially align with other scholarship related to leaders enacting discourses about mathematical expertise residing in the external community (e.g., Spillane, 2005). Specifically, leaders framing problems in ways that do not require strong mathematical knowledge reflect discourses that expertise for improving instruction resides not in the school, but with external objects and individuals.

As alluded to in the studies by Coburn et al. (2009) and Jackson et al. (2018), the problem framing process is often contested, with individuals potentially identifying different problems and framings of those problems (Yanow, 1997). For example, individuals may challenge another's frame by offering counterframes that put forth alternative diagnoses and prognoses of the problem. However, only some of these frames are successful, or achieve resonance—the extent to which a proffered frame is taken up by others or successful in mobilizing support (Benford & Snow, 2000). Education researchers have found that, in schools, problem frames that achieved the most resonance were those proffered or supported by individuals with status and authority (Coburn, 2006; Penuel et al., 2013). For example, those with positional authority mot only have decision-making power, but can set meeting agendas and focus on some issues and not others. Resonance also depends on whether the frame connects or aligns to the interests and values of those it is seeking to mobilize. These strategic maneuvers to link frames to individuals are called frame alignment processes (Snow et al., 1986). In schools, successful frame alignment processes include tapping into individuals' preexisting beliefs and experiences and invoking values or ideas that have widespread acceptance in the school (Coburn, 2006). Then, it is likely that frames that achieve resonance are those that connect to individuals' personal discourses about the subject, or those that invoke social discourses about the subject.

The research reviewed in this section has primarily focused on the identification of problems, and diagnostic (causes) and prognostic (solutions) framing. Though this literature reveals the problems districts identify and how they frame them, and that frames that achieve resonance connect or align to personal and social discourses, it does not explain why only some problems and solutions are taken up for mathematics, and not others. That is, the processes of boundary framing were not empirically examined. I turn to this final topic next.

Boundary Framing

To date, there has been little research investigating the framing of boundaries between school subjects in educational policymaking and leadership. However, boundary research in education more generally can provide insight into the ways in which boundaries around policy for mathematics education might be constructed. This research is rooted in scholarship on social movements and boundary work among fields and disciplines, so I synthesize these literature bases together.

The processes for boundary framing are various and include framing objects in particular ways (Johnston & Baumann, 2007) or determining in-group status based on select characteristics (Gieryn, 1983). The criteria for determining what is included in sex education curriculum, for example, have been defined by heteronormativity and the dangers—rather than the pleasures—of relationships and sexuality (Harrison & Hillier, 1999). These characteristics are not always consistent, however. For example, science is "empirical" when demarcating it from religion, but "theoretical" when contrasted to the utilitarian applications of mechanics (Gieryn, 1983). Implicit in this boundary work is comparing one's boundaries in relation to another's (Hunt et al., 1994; Silver, 1997), which typically involves making "us" and "them" distinctions (Dubuisson-Quellier & Gojard, 2016). For example, in distinguishing between school and industry with respect to vocational education, teachers and students reported that opportunities to experiment and make mistakes at school ("us") contrasted with what is appropriate in work-settings ("them"), where employees are expected to be skilled and efficient (e.g., Jonasson, 2014). In such cases, emphasizing differences maintain and solidify boundaries (Jaworsky, 2016).

As described previously, because boundaries offer material and symbolic resources, boundary shifting—the expansion or contraction of boundaries—is both a strategy and goal for actors (Cherry, 2010; Zolberg & Woon, 1999). For example, Posselt and colleagues (2017) found that one graduate physics program increased access for underrepresented students by expanding the boundaries that define what counts as the ideal physics student. Likewise, districts and leaders engaged in improvement are, at least implicitly, attempting to do something different, rather than just maintaining the status quo, which might include shifting the boundaries of what good mathematics instruction looks like, or the extent to which equity is considered relevant to mathematics. This boundary shifting first involves *blurring* boundaries so that individuals do not know where they fall (Alba, 2005). This strategy includes *focusing* on the boundary to make the implicit boundary explicit, and *universalizing* or emphasizing sharedness, rather than difference (Cherry, 2010). Teachers, for example, blur the boundary between school and family by universalizing both parties as supporting children's best interest (Durand & Secakusuma, 2019). Discursively, this includes using "we" language that positions both groups in a broader category. A second strategy is *boundary crossing* where individuals move from one group to another, physically or discursively (Zolberg & Woon, 1999). The boundaries of a field, whether that is nanotechnology (Grodal, 2018) or curriculum studies (Ansaldo & Goodman, 2002), are expanded when individuals from peripheral communities claim membership, but contracted when those peripheral members disassociate.

Sometimes, individuals who cross boundaries act as *brokers* (see Akkerman & Bakker, 2011) or *boundary spanners* (see Aldrich & Herker, 1977; Goldring, 1990; Penuel et al., 2013) to bridge and convey information across the different communities. This brokering at the boundaries can result in organizational learning and change. For example, Brezicha and Hopkins (2016) found that a community-based organization served as boundary spanners between a school district and its community and helped facilitate the district's uptake of more equity-minded policies. With respect to the boundaries around mathematics education, it is possible, for example, that a district mathematics coordinator may serve as a broker between the mathematics department and those involved in addressing educational equity (e.g., equity committee). This brokering may support the district to expand the boundaries of mathematics education by addressing more problems and solutions related to equity in mathematics.

Objects, as well as people, can cross boundaries (Akkerman & Bakker, 2011). Like individuals, when objects fall in both worlds, they facilitate communication and coordination between the two worlds (Lamont & Molnar, 2002). Boundary objects can be abstract or concrete, and are "plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star & Griesemer, 1989, p. 393). For example, subject-neutral policy documents (e.g., strategic plans; equity professional development materials) may be taken up and enacted in specific subjects, potentially introducing new problems/solutions and reshaping boundaries.

This boundary crossing, or sharing, is more likely when boundaries are blurred, as opposed to "bright" (Rao et al., 2005). When boundaries are bright and agreed upon, the negotiation is not over the boundaries, but around objects, and whether they fall inside or outside the boundaries (Gallo-Cruz, 2012). For example, the U.S. Supreme Court has brightly defined the boundaries around protected student speech in schools, where student speech inconsistent with school values (e.g., too sexual in content) fall outside the boundaries (Ehrensal, 2015). Then, school adults interpret whether particular instances of student speech are appropriate or not (i.e., as falling inside or outside the boundaries of protected speech). In most schools, the speech acts of cheerleaders are condoned by school officials (e.g., cheerleaders perform at school functions), while one student's lewd speech at an assembly was censured and constructed as unacceptable, despite both being sexual in nature (*Bethel School District v. Fraser*, 1986; Ehrensal, 2015).

How boundaries are framed in educational policymaking has not yet been researched, but the ways policymakers establish relations between policy and subject-matter provide some insights into the sorts of boundaries that might exist between policies. “Subject-specific” policies, like adopting a new mathematics curriculum, target a specific subject without regard to others and arise when there is increased attention to particular subject area (e.g., annual curriculum cycle; decline in test scores; Grossman et al., 2004). “Subject-differentiating” policies set priorities among multiple subjects through, for example, differential graduation requirements, allocation of resources, and testing policies. These policies often reflect and enact discourses that some school subjects are important for, say, developing skills necessary for one’s future and contributing to society. While subject-differentiating and subject-specific policies attend to subject-matter, “subject-neutral” policies ignore subject-matter or treat subjects equally. For Grossman and colleagues (2004), subject-neutral policies are common because they simplify the task of policymaking by applying the same solution to different settings, and reflect policymakers’ lack of disciplinary knowledge. Each of these policy types contributes to boundary framing as they position a certain policy as falling within or outside a boundary. For example, subject-specific policies frame the policy as specific to a subject, and, therefore, as falling within the boundaries of that subject, and outside the boundaries of other subjects.

Summary

The purpose of this study was to examine how school mathematics acts as a context for the framing of boundaries around mathematics education policy in school districts. Oriented by the concepts of policymaking in school districts, subject-matter context, boundary framing, and how these might vary by place, I reviewed literature related to: discourses about school mathematics; how subject-specific discourses are enacted in district leadership and policymaking; and problem framing and boundary framing.

Though scholars have argued that leadership and policymaking depend on the subject-matter, the extant research on subject-specific policymaking is sparse. This scholarship has primarily considered how discourses related to the epistemology of the subject are enacted in district improvement strategies and how they shape the ways schools and districts organize for instructional leadership. There are, however, plenty of other discourses about the school subject. For example, given the increased emphasis on equity in schools, and society writ large, discourses about equity in mathematics education are likely to be operating in schools and districts. These other discourses undoubtedly shape district policy, and warrant attention. Likewise, with respect to policy framing, researchers have established the role of epistemology-related discourses, as well as accountability discourses, in the framing of problems and solutions. This research has examined diagnostic and prognostic framing, and less so boundary framing—the conceptual distinctions that demarcate the policies districts pursue for mathematics from other policies. Questions remain as to how discourses about the subject, specifically those related to equity, interact to shape boundaries around policy for mathematics education.

Research from sociology, anthropology, and education broadly reveal how such boundaries might be negotiated and reshaped.

Much of the research reviewed in this chapter were conducted in urban contexts, though there are other types of districts, likely with different subject-matter contexts. Indeed, Munter et al.'s (2023) statewide investigation suggests that district context, in terms of size and proximity to a metropolitan area, vary and are related to problem framing. Therefore, I conducted a comparative case study of two school districts to investigate how boundaries for mathematics education policy are framed, and how the subject-matter acts as a context for such framing.

CHAPTER 3: METHODS

To examine school districts' boundaries for mathematics education policy, and the ways in which the mathematics subject-matter context shaped such boundary framing, I employed a comparative case study design of two Missouri school districts. Case study allows for a deep investigation of a phenomenon in its real-world context, especially when distinguishing between the case and context is not clear (Yin, 2015). Therefore, case study methodology was particularly appropriate as boundary framing operates within broader contexts, including that of the mathematics subject-matter, as well as community and state sociopolitical contexts. By situating a phenomenon in its specific context, case study allows for a more complex understanding of the circumstances and processes in which the phenomenon emerges (Savin-Baden & Major, 2013).

Miles, Huberman and Saldaña (2014) explained that "by looking at a range of similar and contrasting cases, we can understand a single-case finding, grounding it by specifying how and where and, if possible, why it carries on as it does. We can strengthen the precision, the validity, and the stability of the findings" (p. 33). In collecting and analyzing data across two school districts, comparative case study allowed me to develop analytic generalizations that not only advance theory about how the subject-matter acts as a context for policymaking, but also provide practical implications for districts in a variety of other settings (Yin, 2015). Before describing the two school districts that were the focus of my study, I first briefly discuss the hybrid approach I took in conducting this research.

Hybrid Approach to Research

As described in Chapter 1, one goal of this dissertation was to integrate research in educational policy and leadership with that of mathematics education, to study the mathematics-specific nature of district policymaking. In doing so, I hoped to foreground issues of policy in the study of mathematics education, and the ways in which school districts shape teachers' practice, and students' experiences. In some ways, in my investigation of policy boundaries, I worked to blur the boundaries between these two fields, by pursuing intersectional approaches to research that integrated different ideas, theories, tools, and data. Specifically, as described in Chapter 2, I employed conceptual ideas about policy to make sense of district policymaking for mathematics—a topic rarely investigated by mathematics education researchers—as well as understandings of the epistemology and (high-quality and equitable) pedagogies for school mathematics—a subject-specific perspective infrequently taken by policy researchers. In addition, I drew upon ideas about frames and boundaries from sociology and science and technology studies.

To study these various ideas (and the interactions among them), as I further describe, I employed a variety of methods (e.g., case study; discourse analysis; graphic elicitation) that allowed me to view and interact with my data and participants in different ways. As Eisner (1981) explained, "each approach to the study of educational situations has its own unique perspective to provide. Each sheds its own unique light on the situations that humans seek to understand" (p. 11). At the intersections of methods and of fields, new meanings and knowledge are produced when differences and perspectives across boundaries are negotiated and reflected upon (Akkerman & Bakker, 2011). In my hybrid approach to research, combining concepts and methods from different fields supported me in investigating subject-specific educational policymaking in more complex and comprehensive ways that a singular, disciplinary focus might have overlooked. This is because "the more perspectives we are able to include in developing a holistic picture of what it means to teach and learn [and lead and make policy], the more complete the picture is" (Davis & Callihan, p. 508).

Participating Districts

Because my study sought to understand the relationship between boundary framing and subject-matter context, I purposefully chose two school districts with different social contexts— RiverTown School District and RockCity School District (all names are pseudonyms). Yin (2015) explained that cases should be selected so that each "(a) predicts similar results (*a literal replication*) or (b) contrasting results but for anticipatable reasons (*a theoretical replication*)" (p. 57, italics in original). I employed both these strategies for my sampling: similarities between cases were predicted to produce literal replications, while differences were predicted to produce theoretical replications. Next, I describe the similarities and differences that I attended to in selecting RiverTown and RockCity, and the ways in which I expected these similarities and differences to produce replications. I describe the districts and their local contexts in greater detail in Chapters 4 and 5, before presenting findings for my research questions.

RiverTown and RockCity were similar in 1) their performance on the annual state standardized test for mathematics; and 2) their promotion of "reform" or inquiry-based mathematics instruction (e.g., through an officially adopted curriculum). At the time of case selection, both districts (for the 2020-2021 academic year) performed below the state average on accountability tests. Therefore, I hypothesized that the districts were under similar accountability pressures, which would allow me to attend to how these pressures shaped the mathematics subject-matter context, as well as whether and how boundaries were defined by accountability. Regarding pedagogical commitments, both districts used a combination of both "conventional" and "blended" textbooks (Munter et al., 2016). While the instruction organized in conventional textbooks is typically aligned with direct instruction, the instruction in blended textbooks promotes a blend of direct and inquiry-based instruction. Specifically, RiverTown used *Eureka Math* (conventional) for K-5, *Illustrative Math* (inquiry) for 6-8, *Big Ideas* (inquiry) for algebra, and *McDougal Littell* (conventional) for geometry. RockCity used *Everyday Math* (conventional, with problem-solving emphasis) for grades K-5 and *Ready* (blended) for grades 6-8. At the time of my data collection, there were no formally adopted curricular materials for the 9-12 grades at RockCity, though some algebra and geometry courses were piloting *Illustrative Math* (inquiry). Because the formal curricular texts of the two districts promoted similar pedagogical commitments, I hypothesized that the district's subject-matter contexts would encompass similar discourses about mathematics pedagogy. Therefore, I would be able to investigate how such similarities in subject-matter contexts shaped boundary framing.

The districts also differed in two ways: 1) their pursuit of equity initiatives,; and 2) the setting and community the district served. While RockCity was explicitly pursuing equity initiatives, RiverTown was not. So, I was able to investigate if and how different discourses about equity contributed to constructing differences in mathematics subject-matter context, as well as the ways in which those different discourses shaped the framing of equity policies alongside the boundaries for mathematics education. Because school mathematics is a product of the history, culture, and traditions of place (Kilpatrick, 2012), I also purposefully selected districts that served different communities and student populations. RiverTown was situated in a small, rural community, while RockCity was situated in a large, micropolitan community. The student populations also differed in terms of size and demographics (see Table 1, data compiled from state department of education).

Given these differences, I investigated the discourses about school mathematics that constructed each district's mathematics subject-matter context (RQ1), as well as how boundaries around mathematics education policy were framed (RQ2) and how mathematics-specific discourses shaped such boundary framing (RQ3). In comparing the two districts, I attended to the similarities and differences in subject-matter contexts, especially in relation to boundary framing.

Table 1

District Demographic Data Between 2008 and 2022

	RiverTown		RockCity	
	2008	2022	2008	2022
Total enrollment	1590	1530	16,620	17,970
Asian (%)	-	-	-	5
Black (%)	12	7	22	21
Hispanic (%)	2	3	4	7
Multiracial (%)	n/a	7	n/a	10
white (%)	84	82	68	57
Free and reduced-price lunch (%)	41	78	33	44
English language learners (%)	-	-	-	7

Note. Figures were rounded to maintain anonymity. Missouri's inclusion of "multiracial" as a racial category started in 2011.

State and Federal Policy Context

Like most other school districts in the U.S., RiverTown and RockCity were under state and federal accountability policies to meet adequate performance on high-stakes standardized tests. In Missouri, where RiverTown and RockCity were located, the Missouri Assessment Program (MAP) tested students in grades 3-8 for mathematics and English language arts (ELA), and in science for grades 5 and 8. Students were also tested through the End of Course (EOC) exams in Algebra I, English II, Biology, and Government, typically during grades 9-12. In response to the passage of the *Every Student Succeeds Act* (ESSA) in 2015, Missouri started to identify "Targeted Support and Improvement" schools based on low standardized test scores for different student population groups.

During my data collection (January 2022-January 2023), most Missouri school districts (including RiverTown and RockCity) were primarily, if not completely, back in-person, following months of school closures in 2020 and 2021 in response to COVID-19. As part of recovery, the Elementary and Secondary School Emergency Relief Fund (ESSER) provided federal funding to school districts to address the impact of COVID-19 on schooling and student learning. Individual school districts were provided access to this money, as well as state education agencies. The Missouri Department of Elementary and Secondary Education (DESE) used these federal funds to announce a new initiative to support literacy instruction, including providing up to 15,000 K-3 teachers free professional development. Reading was also the subject of new state legislation passed in 2022, Senate Bill 681, which increased requirements for school districts to engage in reading intervention for students.

There were also debates nationally during this time regarding the role of identity (e.g., race, gender) in schools. In Missouri, as in other states, such debates found their way into the state legislature. In the 2023 legislative session, Missouri lawmakers introduced and considered bills (e.g., S.B. 4; H.B. 634) that would place restrictions on how race and gender are discussed in Missouri schools. Because such legislation aims to encode discourses about schooling that likely penetrate districts and the local communities in which districts are situated, these discourses are available to be taken up (or rejected) by district leaders in their sensemaking and enactment of policy.

Data Collection

For Yin (2015), a strength of case study research is the use of a variety of data sources. This allows for triangulation where different data sources corroborate and converge to the same finding. In my study, each case was constructed by analyzing data collected from interviews with district leaders, observations of district leadership and policymaking, and analysis of relevant policy artifacts. For both districts, my data collection occurred from January 2022 to January 2023. Table 2 provides an overview of data collected for each district.

Table 2

Overview Of Data Collected

	RiverTown	RockCity
Number of observations	36	37
Total observation time	61 hours	101 hours
Number of interviews	15	15
Total interview time	14.73 hours	15.57 hours
Number of artifacts	67	89

Access

I was previously involved in other research studies with RiverTown and RockCity district leaders. In early 2020, I was part of a research team investigating the challenges experienced by RiverTown teachers and leaders in trying to implement equity initiatives. For this, I helped interview the RiverTown superintendent and chief academic officer, both of whom were in those same positions during data collection for this study. The principal investigator was my advisor, who was also my dissertation chair.

I was also on a research project in which teachers received funding to complete Elementary Mathematics Specialist (EMS) certification and serve as leaders in their schools. In the summer of 2021, I helped facilitate a summer institute for participants, one of whom became the elementary mathematics coordinator for RockCity. During my data collection, the elementary mathematics coordinator had left the research project, but was still in touch with the project's principal investigator. The principal investigator, during the latter half of my data collection (August-December 2022), served at RockCity as an elementary mathematics coach, often working closely with the elementary mathematics coordinator. Because the principal investigator was also a member of my committee, I did not discuss my research with him until after he had left his position at RockCity. We also informed the elementary mathematics coordinator of this potential conflict of interest. At RockCity, my advisor also had a relationship with the secondary mathematics coordinator through his facilitation of professional development for secondary mathematics teachers.

Because of these previous efforts, I found it easy to gain initial access into both districts and set up interviews with those I already had contact with. At RiverTown, because I had a relationship with the superintendent, she put me in contact with several people to interview and provided me access to district-level administrative meetings. While the mathematics coordinators at RockCity put me in contact with others in their department and granted me access to meetings they were invited to, it was harder to gain access to meetings they were not invited to, and to individuals outside of their department, especially members of the cabinet (e.g., superintendent; assistant superintendents; chief officers). Although I was not able to meet with the RockCity superintendent nor go to closed-door cabinet meetings, I was able to interview all other individuals I contacted and was granted access to several central office meetings.

Interviews

Interviews were an important aspect of my data collection, as talking to people involved in district policymaking allowed me to gain a better understanding of how and why some policies were for mathematics and not others. For example, I elicited individuals' perspectives about the ways in which certain policies intersected specific subjects, and their sense of why that was the case. I interviewed district leaders twice: once at the beginning of data collection, and another at the end. By district leaders, I am referring to individuals who influence district policy, either through a formally designated position or through more informal means (e.g., teacher leader). This was particularly important for my study as my two school districts varied in both size and personnel. As I discuss in further detail in chapter 4, RiverTown was a small, rural school district with a small central office, so leadership over district matters also fell to school administrators (e.g., principals), teachers, and community members. This differed from the larger school district of RockCity, whose district leadership included cabinet members (e.g., superintendents) as well as district leaders working in various departments (e.g., curriculum and instruction; equity) at the central office.

For the first interview, I interviewed eight individuals from each district. At RiverTown, I interviewed the superintendent, chief academic officer, district instructional coach, principals of the PK-2, 6-8, 9-12 buildings, assistant principal of the 3-5 building, and director of the technical education center. At RockCity, I interviewed both the assistant superintendents, the chief equity officer, the director of school improvement and federal programs, the director of the assessment, intervention, and data office, the director of the curriculum and instruction department, and the elementary and secondary mathematics coordinators. In each district, all individuals except one (assistant 3-5 building principal at RiverTown; assistant superintendent of elementary education at RockCity) who participated in the first interview also participated in the second interview.

For the first set of interviews, 13 were conducted in-person at the district, and three were conducted via Zoom. All the second interviews were conducted via Zoom, and video-recorded. All interviews were also audio-recorded and transcribed. Lasting approximately one hour, interviews followed a semi-structured protocol (see Appendixes A-C) with a set of guiding questions (Brenner, 2006). The protocol was flexibly used so that I was responsive to each individual and allowed for new ideas/topics to emerge (Merriam & Tisdell, 2016).

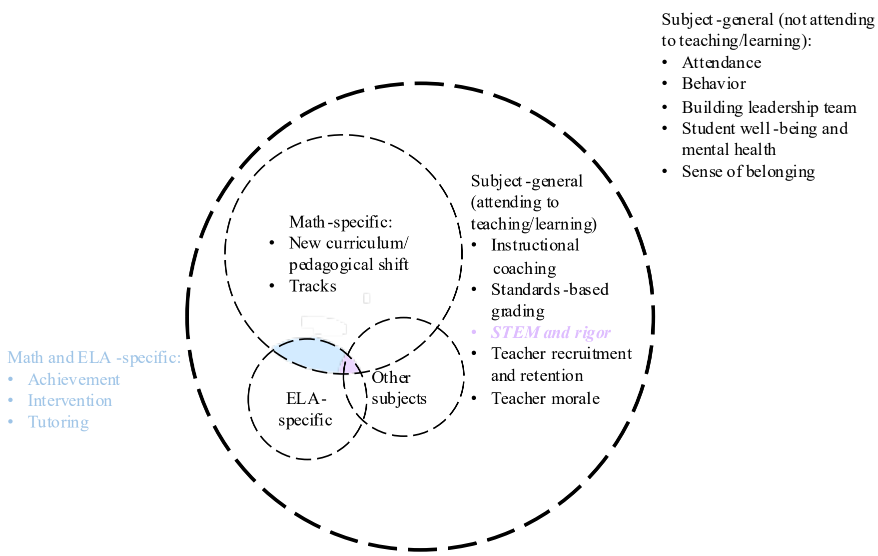
For the first interview, I began first with individuals who I had previous contact with (i.e., superintendent at RiverTown; mathematics coordinators at RockCity), and then, via a snowballing approach (Crabtree & Miller, 1992; Spillane, 2000), I identified other individuals whose responsibilities related to or influenced mathematics education. The interviews elicited: a) their responsibilities; b) their perspectives on perceived problems and current solutions and policies, including those that were subject-neutral, equity-specific, and mathematics-specific; c) their perspectives on perceived supports and challenges; d); their views (i.e., personal discourses), and their perceptions of the district's and others' views (i.e., social discourses), about school mathematics; and e) their interactions with others in the district. I elicited information about individual's interactions with others, including the instances and places (e.g., regularly scheduled meetings) in which these interactions occur, to inform the observations I conducted, which I address in a following sub-section.

Occurring at the end of my data collection, the second set of interviews served two primary purposes. First, I invited participants to revisit and share updates on policy challenges and solutions that were shared during the first interview, as well as additional challenges and solutions that had since emerged, including those that I learned about in my observations or conversations with district leaders (Merriam & Tisdell, 2016). The second purpose was to conduct graphic elicitation, which I describe next.

Graphic Elicitation. Graphic elicitation, the use of diagrams to elicit conversation and sensemaking in research interviews, is particularly helpful when communication about complex ideas can be aided with visual displays (Bagnoli, 2009; Bravington & King, 2019). In my study, the graphic elicitation process included sharing with participants a diagram I constructed that represented my initial conjectures for the district's boundaries around mathematics education (see Figure 1), and eliciting their sensemaking about and interactions with the diagram. As such, graphic elicitation was useful for: 1) respondent validation, where I solicited feedback on my emerging findings about the boundaries (Merriam & Tisdell, 2016); and 2) eliciting participants' further sensemaking about boundaries, and their rationalizations related to subject matter. These interviews were conducted via Zoom, so that I could video-record and capture participants' interactions with the diagram; interviews were also transcribed.

Figure 1

Diagram Used For Graphic Elicitation Interviews With RiverTown Participants



I constructed the diagram—a visual representation that includes both images and written text (Crilly et al., 2006)—based on my emerging findings (data analysis techniques will be discussed in the next section). Broadly, I wrote analytical memos about the policy problems and solutions that were the ongoing source of framing, if and how those policies were framed as specific to mathematics, and the boundaries that demarcated mathematics-specific policies from other types of policies. From this, the creation of the diagram was iterative (Crilly et al., 2006), where I developed visuals and considered the extent to which the visual represented my emerging findings, which triggered new ideas and informed my diagramming. In so doing, I experimented with different symbols and representations and explored the ways in which they accurately and accessibly facilitated communication of the ideas I wanted to express. For example, I considered the ways in which the shape, size, and color of objects, as well as how objects were arranged, conveyed meaning. Because these diagrams were employed in my graphic elicitation interviews, as well as used for visual communication in my presentation of findings, I also considered how the diagrams might be accessed, interpreted, and decoded by participants, as well as readers (Bennet, 2002).

To support participants' sensemaking and interaction with the diagram, I sequentially revealed different aspects of the representation through a series of slides. This was to focus participants' attention to the aspects of the diagram under discussion, and to assess their understanding before adding more layers onto the representation (Crilly et al., 2006). For each layer, I provided a brief verbal explanation of what the objects and labels referred to (and not why I constructed the diagram the way I did). After, I invited participants to share reactions and thoughts about the diagram.

Crilly and colleagues (2006) suggest that participants might provide insights regarding three categories: 1) how I presented the diagram and how participants interpreted it, where misunderstandings could inform future interviews; 2) what specific aspects of the diagram reveal about the concepts being investigated; and 3) discussion of the concepts in general. Because I was most interested in the second and third categories of reflections, I purposefully probed individual's perspectives on: 1) the accuracy of the boundaries and where policies were positioned in relation to those boundaries; and 2) their sensemaking about the ways in which boundaries were framed, especially in relation to the subject matter. Regarding the first, I asked questions like: *To what extent do you* *feel this is accurate? Do you think it is reasonable to distinguish these policies inside the circle from the other policies outside the circle? Are there any efforts that are not included here that you think should be?* Regarding the second, I asked questions like: *What do you see as the reason for this effort being implemented in these subjects, but not others? What do you see as the reason for these efforts being outside the circle? What do you see as the difference between the efforts on the inside of the circle, and those outside the circle?* In my interviews, I found that I was able to elicit participants' boundary framing using the image and metaphor of circles, including how/where they perceived certain policies fell alongside the circle, and why some subjects were prioritized and others ignored. By referencing and interacting with a common stimulus, participants were able to accessibly discuss boundaries and subject-matter context without using the formal theoretical language.

I also invited participants to physically interact with the diagram, and potentially create something new. For example, I asked participants: *Are there any efforts listed that you think are not in the appropriate group or category? Where do you think it should be placed?* Participants were also invited to regroup or create new groupings of policies, as well as shift or create new boundaries (i.e., circles). This, in turn, allowed participants to compare the newly constructed representation to the original, as well as their own ideas and experiences. After all the layers were revealed, I asked participants to share their perspectives on the diagram in general.

Observations

In addition to interviews, I conducted observations of leadership and policymaking. What I observed was informed by my first round of interviews, where I gathered information about spaces in which district leadership and policymaking emerged. In addition to mathematics-specific observations (e.g., mathematics department chair meetings), I also observed subject-neutral events (e.g., school board meetings; district leadership team meetings) as these also shape boundaries around mathematics education, as well as reveal the policies that were subject-neutral and how and why they did (not) cross into mathematics. At RiverTown, I spent about 61 hours across 36 observations of: board meetings; elementary administrative teams; secondary administrative teams; district leadership teams and retreats; instructional leadership teams; mathematics vertical teams; and STEM committee meetings. At RockCity, I spent about 101 hours across 37 observations of: board meetings; leadership councils; curriculum and instruction meetings; principal meetings; mathematics department chair meetings; instructional mentor collaboration days; and various meetings about specific policies (e.g., curriculum adoption; standards-referenced grading; intervention). Though I conducted about the same number of observations across the two districts, because RockCity was significantly larger with more participants at meetings, and therefore more voices and issues to discuss, the amount of time I spent observing was greater at RockCity. For example, the monthly principal's meetings at RockCity were each eight hours long, but only one hour long at RiverTown.

I typed field notes during each observation, recording detailed descriptions of the observations, including the participants, the activities participants engaged in, and the substance (sometimes direct quotes) of what people said (Merriam & Tisdell, 2016). Early in my observations, I attended to the main issues/problems under discussion and the different perspectives individuals had about those issues. Over time, as I conducted more interviews and observations, I sometimes narrowed the focus of my field notes (Savin-Baden & Major, 2013), attending explicitly to how and why some policies were for mathematics, and not others. For example, at RockCity, I noticed in early observations that policies related to standards-referenced grading, while subject-neutral, were negotiated across different demands. So, in subsequent observations, I focused more closely on how individuals discussed differences across subjects to frame policies. In addition to typed field notes, I audio-recorded mathematics-specific events, and for more subject-neutral events, I recorded aspects that were relevant to mathematics. For example, at school board meetings, I did not record discussions related to COVID-19 policies or school facilities, but recorded discussions related to mathematics curriculum and other initiatives.

During observations, I most often assumed the role of "observer as participant," where my role as observer was primary to my participation in the group (Merriam & Tisdell, 2016). I acted as a peripheral member and only occasionally participated with others, through small-group conversations or activities with those at my table, at the request of the individual facilitating the meeting. During these interactions, I tried to move between my roles of participant and observer, recording details of the observation when possible.

Artifacts

Finally, I collected relevant artifacts, including those that were employed or shared during observations (e.g., meeting agendas; strategic plans), as well as those that were referenced and discussed during interviews. Artifacts relevant to policy issues or those that employed mathematics-discourses were collected and analyzed to gain a better understanding of how policy issues were framed alongside various boundaries, as well as the discourses that construct the district's mathematics subject-matter context. These artifacts also provided an avenue for further interviewing, as I invited participants to share about the creation of these materials and their role in policy for (mathematics) education in the district.

Overall, I collected 156 artifacts, 67 from RiverTown and 89 from RockCity. Artifacts included meeting agendas and minutes, building and district reports, internal newsletters, policy proposals, strategic plans, curricular documents, meeting presentations and documents, and public communication. In addition, I collected student and community demographic data from state databases and the U.S. Census, as well as newspaper articles about the district and community, in order to understand the local and state sociopolitical contexts.

Data Reporting

In the findings, reported data are referenced using the following format to indicate the data source and date of data collection: data source, YYMMDD. For example, a reference to a second interview conducted on December 11, 2022 appear as: interview 2, 221211. In addition, when quoting individuals, I attribute the quote to the individual's role in the district. For select quotes—those I have deemed to be potentially harmful to participants if readers were to associate the quote with an individual—I chose to attribute the quote to a generic "district leader" or not specify the person's specific position. For example, instead of specifying the elementary or secondary mathematics coordinator, I simply wrote "mathematics coordinator" or "curriculum & instruction coordinator."

Though I received consent, I wanted to ensure that I protect and maintain the confidentiality of my participants.

Data Analysis

Since my study was a comparative case study, data were analyzed within cases, as well as across cases. Within-case analysis is focused on describing and explaining what is going on in a particular context. With the goal of detailed contextual understanding, the within-case analysis helps to explain why and how the phenomenon occurred (Savin-Baden & Major, 2013). Cross-case analysis attends to patterns that occur in both cases and explaining how and why such patterns occur (Miles et al., 2014; Yin, 2015). That is, cross-case analysis seeks to develop a general explanation that applies to all the cases (Merriam & Tisdell, 2016). In the following subsections, I first describe my within-case analytic procedures for each research question, then discuss my cross-case analysis.

Research Question One

My first research question was: *What discourses about school mathematics construct the mathematics subject-matter context in school districts?* To examine discourses, I employed the methodological tools of discourse analysis, which helped me attend to the texts and language associated with specific ways of seeing the world (Anderson & Holloway, 2018). In my study, I was especially interested in the discourses that construct understandings and interpretations of (school) mathematics. Because I viewed discourses as both language and the practices, assumptions, and ideologies reflected in language (e.g., Gee, 2014), my analysis attended to the ways in which district leaders' talk, policy texts, and district-wide structures and routines enacted assumptions or narratives about school mathematics. Coding of discourses was informed by the reviewed literature on different discourses about school mathematics, including discourses related to: mathematics as a core school subject; the epistemology of school mathematics (e.g., degree of definition; scope; static nature; sequence); learning, pedagogy, and curriculum in mathematics; and equity.

I also looked for other discourses about school mathematics that did not fit these categories (e.g., discourses about mathematical activity and competence), as well as subject-general discourses. Subject-general discourses that frequently surfaced were those related to accountability, so I considered how accountability discourses interacted with mathematics-related discourses. That is, I considered *interdiscursivity,* the blending of discourses. Interdiscursivity occurs when there is presence of one discourse in another (Lewis & Ketter, 2004), which can rearticulate otherwise stable discourses (Fairclough, 1992). In my analysis of interdiscursivity, I analyzed for traces of accountability discourses in mathematics-specific discourses, and considered when and where this interdiscursivity operated and the function of such discourses working together.

In characterizing the subject-matter context, I focused on discourses that were more *dominant*—discourses that were naturalized, whose ideological assumptions were commonsense (Fairclough, 2015). For each discourse, I wrote analytical memos about how often the discourse was employed, and in what capacity, including from whom, when, and in what policy texts and/or official district-wide routines and structures. That is, I considered the sources that discourses emanated from, including from personal and/or social discourses. This helped me to characterize different ways in which a discourse might be dominant: when a majority of participants invoked the discourse in their talk and/or when a discourse was institutionalized through policy texts or formal structures and practices. I also looked out for *dominated* discourses, as these also reveal the nature of the subject-matter context—that is, the discourses that were less influential in guiding and constraining practice.

Research Question Two

As a reminder, my second research question was: *In what ways are the boundaries around policy for mathematics education framed in school districts?* To answer this question, I first operationalize what I mean by "policy for mathematics education." In this study, I am referring to the policy problems and solutions districts identify specifically for and as being explicitly about mathematics education. Because policy constitutes both *text* and *discourse* (Bacchi, 2000; Ball, 1993), I considered how official policy texts, routines, structures, and programs, as well as the language individuals used to talk about the aforementioned items, identified and framed problems and solutions for mathematics education. To be clear, I focused on district-level policy framing—what is constructed as problems and solutions—and not the implementation of such policy at the school or teacher level. Then, *boundaries* of policy for mathematics education referred to the conceptual distinctions that demarcate "mathematics education" problems and solutions from "non-mathematics education" problems and solutions.

Because my data collection included graphic elicitation during the second interview, in which one purpose was to solicit feedback on my emerging findings about each district's boundaries, my within-case analysis for this research question included two steps. The first step consisted of analyzing data I had collected up to the second interview to formulate initial conjectures about each district's boundaries and how policies fell alongside those boundaries. This was used to construct a diagram for use in the graphic elicitation interviews. Then, the second step of data analysis consisted of analyzing the data collected during those interviews and comparing it to the previous data analysis round, to inform and revise those diagrams, and what those diagrams reveal about boundary framing.

Step One. Because boundary framing happens as actors engage in diagnostic and prognostic framing (Silver, 1997), analysis for this research question began with coding of problem framing. From all field notes, interview transcripts, and artifacts (collected up to the second round of interviews), I identified problems and solutions that were the object of ongoing framing (Coburn, 2006). I considered a policy to be a source of ongoing framing if multiple people or artifacts referenced the policy, and/or it was the topic of conversation in multiple observations. Sometimes, I grouped policies into a larger category if they were talked about together or addressed the same problem. For example, in both districts, I grouped the behavior challenge and the solutions for addressing it together as "behavior."

Then, I categorized each policy based on its relationship with the subject matter of mathematics: mathematic-specific policy, mathematics-differentiating policy, or subject-neutral policy. My initial categorizations were informed by the distinctions offered by Grossman and colleagues (2004). As described earlier, mathematics-specific policies support mathematics without regard to other subjects, while mathematics-differentiating policies prioritize mathematics over other subjects. Early in my data collection, I found that, in both districts, mathematics and ELA were the targets of additional attention and resources, so such efforts were categorized as mathematics and ELA-differentiating policies. Subject-neutral policies were those that ignored subject matter or treated subjects equally.

From these initial categorizations, I wrote analytical memos about the ways in which individuals and policy texts distinguished mathematics-specific policies, mathematics-differentiating policies, and subject-neutral policies from one another. To analyze the policy boundaries, for each category (mathematics-specific, mathematics-differentiating, or subject-neutral), I considered how the policies were framed in similar ways, and how those framings differed from other categories. For example, with respect to the boundaries around policy for mathematics education, I worked to identify characteristics that districts and leaders attributed to problems and solutions for mathematics education (Johnston & Baumann, 2007). This was an iterative process, starting with open-coding (Corbin & Strauss, 2015). I then engaged in axial coding and related the codes to each other to refine the characteristics for in-group status (i.e., the characteristics that determine whether a problem/solution is specifically for mathematics; Gieryn, 1983). Through the constant comparative method (Glaser & Strauss, 1967), I examined whether mathematics-specific and mathematics-differentiating policies embodied these characteristics (Gallo-Cruz, 2012), particularly when comparing to problems/solutions for other or all subjects (Hunt et al., 1994).

To consider why some policies fell outside the boundaries of mathematics education, I analyzed for "us" versus "them" language (Dubuisson-Quellier & Gojard, 2016), as well as language emphasizing differences (Jaworsky, 2016). For example, investigating how individuals and artifacts framed subject-neutral policies (e.g., equity) as not supporting specific subjects revealed how such policies did not meet the characteristics for in-group status. In addition, I also considered how individuals or policy documents employed strategies for boundary shifting. This included looking for ways leaders and objects blurred (Alba, 2005) and crossed (Akkerman & Bakker, 2011) boundaries. With respect to blurring, I analyzed for the emphasis of sharedness and the use of "we" language (Cherry, 2010). For crossing, I analyzed for if/how individuals crossed organizational boundaries to collaborate in enacting subject-neutral policies. For example, at RockCity, I considered the extent to which and in what instances individuals from different departments (e.g., equity; curriculum and instruction; assessment) collaborated. I also considered if policy texts functioned as boundary objects (Star & Griesemer, 1989) to facilitate communication between groups.

These initial findings about policy boundaries, and my categorizations of each policy based on its relationship with the subject matter of mathematics, were then used to construct a diagram used for graphic elicitation. The process for this was described earlier, so in the following, I explain how I analyzed the interview data.

Step Two. As a reminder, in the graphic elicitation interviews, I shared with participants a diagram (e.g., Figure 1) that displayed various boundaries (represented as circles) and policies inside/outside those boundaries. Participants were invited to share their reflections on 1) the accuracy of the boundaries and where policies were positioned in relation to those boundaries and 2) their sense of how boundaries were framed, especially in relation to the subject matter. For this second research question, my analysis focused on participants' responses for the first category.

First, for each policy and boundary, I categorized participants' responses into one of three categories: 1) participants validated the accuracy of my conjectures; 2) participants disagreed with my conjectures; or 3) participants suggested something I had not considered or accounted for. Of course, participants sometimes differed from one another in their framing of a boundary or how a specific policy is framed in relation to a boundary. So, I considered the frame that was most *resonant*. Of my entire data set, I analyzed for the frame that a majority of participants invoked, and/or institutionalized through, for example, policy texts or formal structures and practices.

In most instances, participants' responses fell in the first category, and therefore validated my initial findings. Then, these responses helped to refine and provide additional clarity to my emerging findings. For participant responses that fell in the second and third categories, I compared the data collected during graphic elicitation to the rest of my data set, and reflected on potential reasons for the discrepancy to refine my findings. Oftentimes, responses within the second category disagreed with my labeling or placement of policies. Responses within the third category often were a policy/effort that I did not originally include because they were not often discussed by the participants I interviewed or in the meetings I observed.

Research Question Three

My third research question was: *How are such boundary framings shaped by the mathematics subject-matter context?* Because this question sought to understand the relation between discourses about the subject (via the mathematics subject-matter context) and boundary framing, I again employed discourse analysis. In policy research, discourse analysis can help reveal the ways educational discourses construct and codify policy (Lester et al., 2017). Theoretically, discourse analysis is oriented by an understanding that discourse is the medium through which individuals enact social practice (Gee, 2014). Fairclough (2015) describes this relation as a dialectic, where discourse is socially determined, and has social effects. Then, in this study, discourse analysis helped me attend to the ways discourses construct policy for mathematics education, specifically, how boundaries for such policy are framed.

I interrogated the data for patterns regarding the role of mathematics-specific discourses in how district leaders and policy artifacts distinguished between mathematics-specific policy and policy for other/all subjects. For example, in my analysis, I asked questions like: *Were some discourses being employed to legitimize particular problems/solutions? Were some discourses constraining some problems/solutions?* I also considered how frames that achieve resonance connected to individuals' personal discourses about mathematics, or invoked social discourses about the subject (Coburn, 2006). Inversely, I considered whether frames that did not achieve resonance were incompatible with dominant discourses (Courtney & Mann, 2020).

To answer these guiding questions, I wrote analytical memos where I employed Gee's (2014) building tasks. Gee (2014) explains that discourses "build" seven areas of "reality." Specifically, discourse can be used to: 1) render certain things as more or less *significant*; 2) enact certain *practices*; 3) attribute oneself or others with a certain *identity*; 4) signal a particular sort of *relationship* with others; 5) construct what is considered *"normal," "good," or "correct*"; 6) render things as *connected* or unconnected; and 7) privilege some *language* or sign systems over others. Gee recommends that a discourse analysis attends to just a few, so given my focus on boundary framing and mathematics subject-matter context, the building tasks that I attended to were *significance*, *practices,* and *connections*. For each of the discourses identified in my analysis, I asked questions like: *How was this discourse being used to make school mathematics significant or not to this problem/solution, and in what ways? How did this discourse connect or disconnect mathematics to this problem/solution? What discourses did this practice (not) enact?* I then compared and contrasted the role of the discourses, and through a grounded approach, identified themes in how the subject matter acted as a context for boundary framing. Specifically, I developed hypothetical statements for the mechanisms through which discourses about the subject framed a particular boundary or policy, and examined if my hypothesis fit other instances of framing. If not, I revised my hypothesis, and worked to clarify the instances when certain mechanisms were (not) applicable.

Cross-Case Analysis

Cross-case analysis was simultaneous to within-case analysis and informed data collection, as I iteratively considered how and why what was foregrounded in one case was present (or not) in the other case. For example, when I found the presence of any unexpected discourses about school mathematics (i.e., discourses that were not examined in my literature review) in one district, I considered whether and how those discourses appeared in the other district. This was accomplished by writing analytic memos, where I attended to emerging themes and differences across districts (Merriam & Tisdell, 2016). Based on my case selection strategy, I analyzed for whether and how the cases displayed similar results (a literal replication) and/or contrasting results but for explainable reasons (a theoretical replication; Yin, 2015).

For the first research question, cross-case analysis was guided by the following questions: *What were meaningful similarities and differences across districts' mathematics subject-matter contexts? How did the source and dominance of* *mathematics-related discourses differ between districts?* For the second research question, I considered: *How were policy boundaries similar or different across districts? What boundary framing mechanisms spanned both districts, and which mechanisms differed across?* For example, I considered how characteristics that define mathematics problems/solutions in one district were (not) relevant to the other district. Also, when I noticed a particular boundary in one district, I considered whether that boundary was also operating in the other district. For the third research question, I considered: *How do similarities and differences in SMC relate to similarities and differences in boundary framing across districts? How did discourses function similarly or differently across districts?* For example, I considered if similarities in the districts' SMC also mapped to similarities to how boundaries were framed, and the mechanisms for such boundary framings. For differences, I considered the potential reasons for discrepancies, including factors related to organizational structure and local context.

CHAPTER 4: RIVERTOWN SCHOOL DISTRICT

The purpose of this chapter, as well as Chapter 5, is to provide an in-depth analysis of each case. Each case begins with a description of the district and its local community, in order to situate each district's policymaking in its specific context. Then, organized by the research questions that guided this study, I describe the dominant mathematics-specific discourses that characterized each district's mathematics subject-matter context (research question 1). After discussing how the district's boundaries of mathematics education policy were framed (research question 2), I then reflect on how those boundaries were shaped by the mathematics subject-matter context (research question 3). After describing each case, in Chapter 6, I discuss cross-case similarities and differences.

As I shall illustrate in this chapter, the case of RiverTown is one of a small, rural school district whose boundaries for mathematics education policy were narrowly constrained to achievement concerns, reinforced by discourses about mathematics as core, meeting students' needs, and accountability, and to some extent, mathematics as defined (agreement over the content) and sequential (mastery of prior learning is necessary for future learning). Falling outside the boundaries of mathematics were policies and efforts for supporting instruction in general, as well as issues of staff recruitment and retention, attendance, behavior, and students' sense of belonging and mental health. Some subject-neutral policies, like tracking and efforts to increase rigor, explicitly prioritized mathematics, because mathematics was core, sequential and well-defined. Other subject-neutral policies, like equity, never crossed into mathematics, where the boundary separating these efforts and mathematics were, in part, maintained by the absence of equity-related discourses, especially in mathematics, as well as discourses about mathematics as defined and sequential.

RiverTown's Local Context, Organizational Structure, and History

RiverTown's Local Context and Demographics

RiverTown School District was located in a small, rural community about two hours from the nearest metropolitan center. As the county seat, it was the largest community in the county, comprised of almost 8,000 residents. For 2017-2021, the median household income for RiverTown families was just above $46,000, with the per capita income slightly above $20,000—figures that are significantly lower than the state averages at $61,043 and $33,770, respectively (US Census Bureau, 2021). The RiverTown community was characterized by a struggling local economy, with significant loss of business over the past 15 years. Specifically, between 2009 and 2015, four major employers left, taking over 1000 jobs.[2] Politically, RiverTown tended to vote conservatively.

In 2020, approximately 82% of the local population was white, with almost 10% identifying as Black and another 7% identifying as multiracial (US Census Bureau, 2020). About 3% of the population was Hispanic. Similarly, the student population at RiverTown in 2022 was: 82% white, 7% Black, 7% multiracial, and 3% Hispanic. 78% of RiverTown students in 2022 qualified for free and reduced-price (FRL) lunch, which had significantly increased from 41% in 2008. As indicated in Table 1, during that same

[2] To protect the anonymity of the districts and participants, I have not cited the newspaper articles used to describe the RiverTown and RockCity contexts.

period, the racial and ethnic demographics of the RiverTown student population stayed constant. Four schools (grades PK-2; 3-5; 6-8; 9-12) and one technical education center (that serves the county) comprised the 1,500-student district.

RiverTown's Organizational Structure

RiverTown was governed by a seven-member board, with the central office overseen by the superintendent and included an assistant superintendent (primarily in charge of facilities, transportation, and safety) and chief academic officer. Given the small number of central office administrators, the district leadership team also included the principals and vice-principals of each of the four buildings, the director of the technical education center, the district instructional coach, the athletics director, and the special education director. There were no mathematics-specific district leaders in RiverTown.

In recent years, RiverTown had experienced leadership turnover: this was described by several district leaders and noted in the district self-assessment. Specifically, for the 2021-2022 academic year, there were new principals at the PK-2, 6-8, and 9-12 buildings, as well as new assistant principals in the PK-2 and 6-8 buildings. Moreover, early in the 2022-2023 school year, the principal of the 3-5 building stepped down. Because of this turnover and new leadership in the district, the superintendent purposefully created new leadership structures. This included monthly district administrative team meetings, as well as separate monthly meetings for elementary administrators and secondary administrators. In the spring-summer of 2022, each building also formed leadership teams as well as data teams, both of which included teachers. District leaders described these new leadership structures as supporting collaboration and communication among building administrators and teachers, as well as across buildings. Beyond building leadership teams, teachers were involved in district decision-making through the superintendent's advisory council, as well as several district-wide committees.

Given the small and flat district leadership team, as well as intentional efforts to include teachers, decision-making in RiverTown tended to be very collaborative. For example, the district instructional coach explained that "it's a very collective effort, anywhere from the superintendent, all the way down to the classroom teachers. You know, we work really hard in our district to get teacher input on a variety of things" (interview 1, 220506). While interviewed district leaders acknowledged that the superintendent and board had final decision-making authority, they all felt like they had a voice and were sought input from. District leaders also shared that teachers' opinions were valued and solicited through various district committees.

Accountability and Diversity Efforts at RiverTown

On state standardized tests in mathematics and English language arts, for 2018-2021, RiverTown consistently performed below the state average—overall, as well as for their Black, multiracial, and Hispanic student populations, but not for students qualifying for free and reduced-priced lunch. Moreover, there were significant disparities between RiverTown's white students and students of color. The middle school, in particular, was identified by the state as a "Targeted Support and Improvement" school for the 2019-2022 school years for low standardized test scores for their Black students and students with an individualized education plan (artifact: notice from Missouri Department of Elementary and Secondary Education).

To address concerns with respect to disparities in standardized test scores, in 2018, RiverTown convened a Diversity Task Force (DTF) with local community members (Nguyen et al., 2021). Headed by the superintendent, the DTF's main initiative was a mentoring program. Though originally designed specifically for Black students, after receiving community backlash from (mostly) white parents, the mentoring program was made available to all students. Because of the COVID-19 pandemic, the DTF was unofficially disbanded, but in 2022, it was reworked as the superintendent's advisory council for community and parents. The superintendent shared that the council was "centered around opportunities for all kids" (interview 1, 220411), where she strategically invited parents of underrepresented student populations.

RiverTown's Mathematics Subject-Matter Context

In RiverTown, the mathematics subject-matter context (SMC) was saturated with discourses about mathematics as core. These discourses were very visible; they were explicitly stated in policy texts, reflected in the prioritization of these subjects in resources and attention, and openly acknowledged by participants. By contrast, more implicit and hidden were discourses about mathematics as sequential and defined, which reinforced discourses that narrowly define mathematical activity and competence. While they were less visible (i.e., not explicitly stated in policy texts), these discourses were still dominant, as they were ingrained in longstanding tracking structures, as well as intervention and accountability policies. Less dominant, though more contested, were discourses related to mathematics pedagogy and equity. There were competing definitions and perspectives on what high-quality mathematics instruction looks like. Likewise, the role of equity in schooling was contentious, and limited to notions of access and “meeting students’ needs.” Intertwined with these discourses were also accountability discourses. Together, these discourses interacted to construct the mathematics subject-matter context at RiverTown.

Below, I discuss these main discourses and how and where they were employed by district leaders and through RiverTown policies and efforts. This is not meant to be an exhaustive account of all the discourses present in RiverTown. Instead, I focus on those that were most common, and most relevant to school mathematics.

Explicit and Visible Discourses about Mathematics as Core

In RiverTown, mathematics and ELA were the most core school subjects. This was reported by all interviewed district leaders, explicitly stated in policy texts, and reflected in the greater allocation of resources and instructional time. For example, tutoring and intervention focused only on these two school subjects, and the elementary school schedule allocated more instructional time for mathematics and ELA than for science and social studies.

At RiverTown, mathematics was a core school subject for two main reasons. First, all district leaders explained that the primary reason why mathematics is core is because of the emphasis on mathematics from state accountability policies. For example, the superintendent explained that “ELA and math tend to be where we start with initiatives, because they were assessed at the state level. So, our priorities often go, if we're going to do something to address an instruction piece, or something along that line, it will be through ELA or math. Because they're tested subjects” (second interview, 221207).

Discourses about mathematics as core and tested were also explicitly enacted in formal policy texts. For example, the first goal (of five) in the district's continuous improvement plan (updated November 2022) was focused on student achievement: the RiverTown school district "will increase student performance in ELA, mathematics and science as measured by district-level benchmark assessments and the MAP [Missouri Assessment Program]." Again, mathematics and ELA were the targeted school subjects because they were the most tested, including through state and internal district assessments. While the district's continuous improvement plan here included science as one of the priority content areas, in reality, science was largely overlooked. This was evidenced by RiverTown's assessment inventory (see Figure 2), which indicated that mathematics and ELA were the only subjects for which the district employs internal assessments.

Figure 2

RiverTown's Assessment Inventory

Assessment Name	Subject	Grade(s)	Purpose (How are you using this information?)	Locally developed? (Yes/no)	Number of times administered per year
Evaluate	Math ELA	K-8	Data teams; individualized instruction	No	K-1: 4 times per year; 2-8: 9 times per year
DIBELS, 8th Ed.	ELA	K-3 4-5 (adding in 2022)	RTI; Dyslexia; Title I services	No	3 times per year
Words Their Way	ELA	2-6	Dyslexia; Title 1 services; RTI	No	3 times per year
Scholastic Reading Inventory	ELA	6-9		No	3 times per year
Missouri Connections	Career	6-8	8th ELA	No	1 time
Orleans-Hanna Algebra Prognosis Test	Math	7th	8th grade math placement	No	1 time
Lee Test of Algebraic Ability	Math	8th	HS math placement	No	1 Time

Moreover, there was much less state mandated testing in science, and district leaders saw improvements in mathematics teaching as a way to improve science performance. For example, the chief academic officer explained:

> There is science testing. We know the science MAP testing in fifth and eighth grade is very heavily math based, like it's a lot of read this chart or this graph, some data inquiries, and so we're like, hopefully if they're getting good math instruction, that will carry over into the science. But I think it's probably primarily because the state holds us accountable more in ELA and math than they do social studies, I guess. They could care less because there's no state testing besides government EOC [End of Course assessment] (first interview, 220419).

Even though there was state testing in science, as well as social studies, there was a greater emphasis in such accountability policies for mathematics and ELA. In addition, the scope of science, where mathematics is perceived to be required for science learning and doing, was used to prioritize (improvements in) mathematics instruction over science instruction. Here, district leaders' treatment of science reveals a second reason why mathematics is core—the utility and transfer of mathematical skills to other contexts.

Related were discourses about mathematics supporting students to learn "foundational" skills important for life. For example, the high school principal explained that "I've always said I want students to read, write, and solve problems, because if they can do those things, they will be functional citizens" (second interview, 221210). Here, the principal drew upon ideas about the usefulness of mathematical knowledge, in particular for practical purposes of solving everyday problems and preparing students for their role in society. Overall, seven of eight interviewed district leaders described this "utility" of mathematical knowledge, whether that be for learning other subjects or for "life." This core function of mathematics was especially important at the K-2 grades, where there is no state testing. The K-2 building principal explained that literacy and mathematics were core subjects because "we just know that these are like the formative foundational years for students, and so we have to provide them with really strong, you know, number sense and also decoding skills" (first interview, 220511). In the second interview, the principal elaborated that this was because "you have to have a good foundation in reading and math in order to be successful in other content areas" (221207).

While discourses about the utility of mathematical knowledge derived from the intrinsic properties of the discipline, and were revealed through individuals' personal discourses, mathematics as tested discourses emanated from accountability policies, and were enacted in RiverTown policy texts (e.g., continuous improvement plan) and efforts and routines (e.g., internal assessments and associated data teams) that prioritize mathematics (and ELA) over other school subjects. Together, these discourses permeated all facets of RiverTown district policymaking: in district leaders' personal discourses about the discipline and the status of the school subject, as well as social discourses encoded in official RiverTown policy texts, and institutionalized routines and efforts. This contributed to creating a subject-matter context where mathematics and ELA were the prioritized subjects in the district.

Though mathematics as core was hegemonic and uncontested, it was not the only core subject; so was ELA. This meant that RiverTown and its district leaders had to negotiate the competing discourses of mathematics as core and ELA as core. Regarding the latter, beyond accountability policies, several other Missouri policies promoted ELA as core discourses. First, the state sponsored and provided free literacy instruction professional development for K-3 teachers. At RiverTown, 24 elementary teachers across the K-2 and 3-5 buildings were participating in this literacy professional development (artifacts: August 2022 Building Reports to the Board). Moreover, there was new state legislation mandating reading intervention. Passed in 2022, Senate Bill 681 increased requirements for school districts to engage in reading intervention. RiverTown leaders were already working to address this, as such legislation was the topic of conversation during the May 17, 2022 district administration team meeting.

Implicit and Ingrained Discourses about Mathematics as Sequential and Well-Defined

Epistemologically, school mathematics at RiverTown was understood as sequential and well-defined. In contrast to how mathematics as core was explicit and visible—written in policy texts and openly acknowledged—discourses about mathematics as sequential and defined were more implicit. Though not explicitly stated in policy texts, these discourses were expressed in interviews, as well as hidden behind ingrained school structures like intervention and tracking.

All interviewed district leaders enacted discourses that reflect understandings that mathematics is inherently linear and sequential, where mastery of prerequisite mathematical ideas was perceived to be necessary for engaging in more complex concepts. For example, the district instructional coach explained that:

> [Math], it's one of those subjects where, in order to get to the next stage, you have to know what's happened before. So if, as we think about like elementary through high school, a lot of your foundational work is happening at the elementary level, the basics, the basic operations of math. And then as you work your way up into

> middle school and high school, it gets a little bit more specific with concepts that they're learning, but they have to be able to apply the foundations to be able to successfully, you know, do the new math…You have to have those basic foundations, but because math is so concrete, and it's so you know, specific to the actual, like, you've got your concepts that you're teaching, and oftentimes, there may only be only be one way to get that answer. Whereas other subject areas, there are, you know, there's multiple ways to express something in writing, versus something in math. So, you know, to me, math is one of those subject areas where you really have to be able to follow it all the way through, to be able to understand what you're doing, compared to other subject areas where it's, it may be a little bit more, things may be a little bit more separated versus having to spiral everything together (interview 2, 221216).

For the instructional coach, it was necessary that students learn "foundational" mathematical skills in the elementary grades before they engage with "new" concepts in the secondary grades. While other subject areas were more "separated" in their concepts, mathematics was composed of "stages" that that were predicated upon the "basic operations." For both the middle and high school principals, this linearity of mathematics was understood through the metaphor of "building blocks" that must be successively mastered.

In the district instructional coach's quote above, she also intertwined the sequentiality of mathematics with the idea that mathematics is "concrete" and "specific," and that there is only "one way to get that answer." These ideas drew upon discourses of mathematics as well-defined, where there is agreement on what mathematics and mathematical knowledge is, because it is seen as objective, unambiguous, and clear-cut. This stood in contrast to other subjects, like writing, where there were “multiple ways to express something.” Five of eight interviewed district leaders expressed such ideas about mathematics as well-defined and agreed upon, often through comparing mathematics to other school subjects. As another example, the high school principal explained that, for mathematics, it is clear that “this is the content area that students need to master.” Here, “mastery” was predicated on the clearly defined and agreed upon nature of mathematical knowledge. By contrast, other subjects were more “subjective,” for example, “interpreting the author’s feedback and tone for a novel might be very different based on how you do that work” (interview 2, 221210).

Beyond personal discourses, RiverTown district leaders’ talk in interviews revealed the ways in which social discourses about mathematics as sequential and defined were implicitly encoded in institutionalized policies and routines, including the use of data to inform instruction and intervention, as well as ability grouping and tracking practices. Regarding the former, the PK-2 building principal explained that:

> When you look at our end of the unit math assessments, if we're noticing that there is a math standard that students are consistently not scoring well on, then we'll talk about how we're going to address that, even though we're moving on to a new, like a new unit. But are we going to come back and hit that and review? Are we going to do that with math small groups and pulling groups of kids? Or is there someone who, like a provider like we have, like sometimes our counselor, our guidance counselor or librarian, or we have student teachers who will be able

> to pull a group of students to work on a piece of their Tier one instruction that they did not master or that they're not secure in (interview 1, 220511).

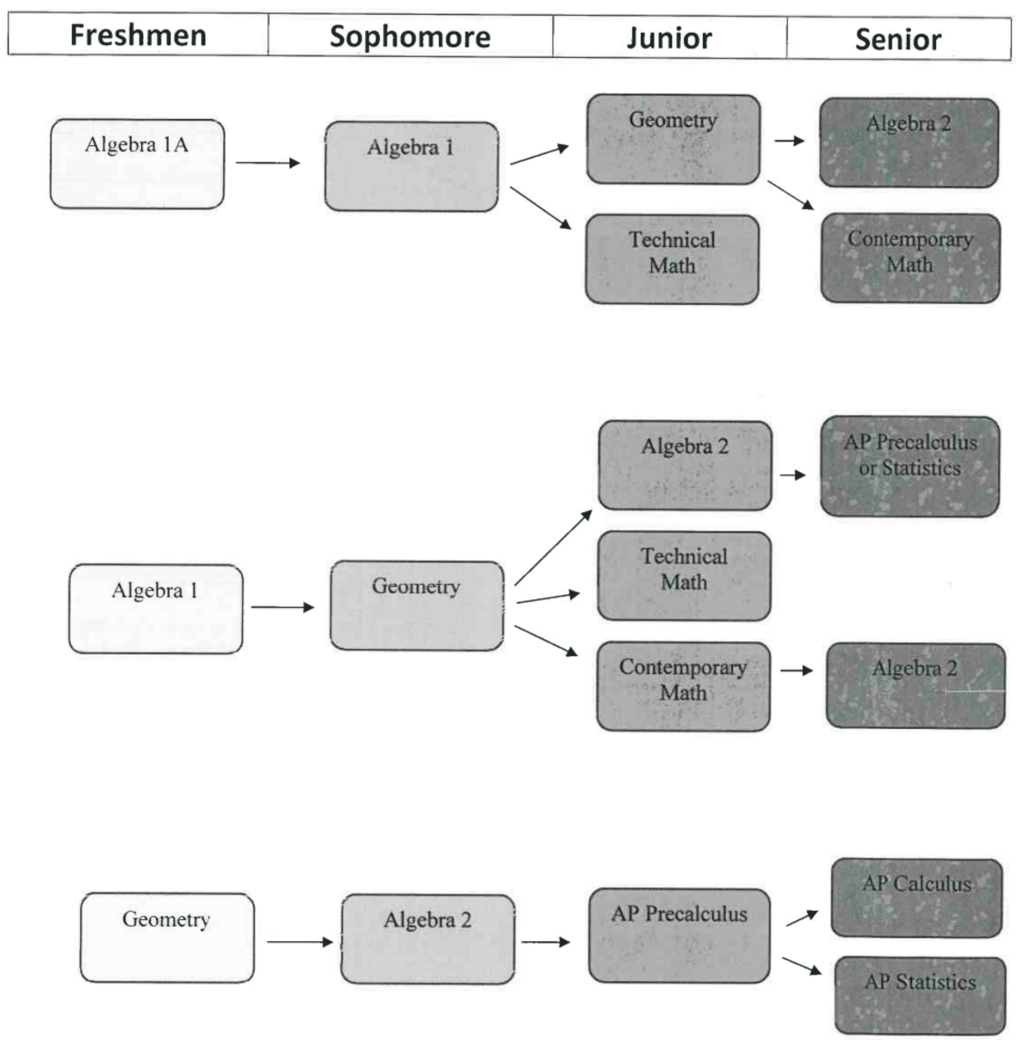
Here, the principal described that, even though the class is moving onto a new unit (likely due to pressure of content coverage), teachers use internal mathematics assessments to identify the mathematical standards that students "did not master or that they're not secure in" so that teachers can review that content to support students' successful learning of newer units. Implicit in this routine were discourses about mathematics as sequential: intervention is necessary because students will not be successful in newer units without mastery of prerequisite skills.

Another implicit assumption behind these data and intervention practices was that standards and assessments *define* mathematical knowledge and competence. Because mathematics is well-defined, teachers can agree on what is considered mathematical activity and competence, and therefore how to objectively measure it. These are then subsequently used to sort students into groups based on whether they need review of previous material, serving to create another sequence, or hierarchy: students who are behind; students who are on track; students who are ahead. This hierarchy of students and their mathematical competence was undergirded by the sequence of mathematical content that needs to be mastered in a specific order.

In RiverTown, ability grouping operated in various forms, including through intervention, within-class ability grouping, as well as between-class ability grouping, or tracking. By tracking, I refer to the separation of students who take advanced courses from students who take the grade-level course. Mathematics was the only subject with tracking at the middle school, where 8^{th} graders are placed in either Algebra 1 or 8^{th} grade mathematics. At the high school (see Figure 3 for the different tracks available at the high school; from High School Career and Educational Planning Guide), tracking operated not just through advanced courses, but also slowed-down courses that provide exposure to foundational concepts (e.g., Algebra 1A, introduction to algebra concepts), as well as courses that help students fulfill their mathematics requirements but do not address traditionally "advanced" topics like calculus and statistics (e.g., technical mathematics; contemporary mathematics).

Figure 3

2022-2023 Mathematics Tracks at RiverTown High School



In describing contemporary mathematics, the director of the technical education center explained that:

> It's a lower-level math. Because they've got algebra 1A, algebra. And then they've got geometry and some of the advanced classes, and I think contemporary [math] kind of fits in in one of those lower levels…I think we have a lot of kids who are kind of at this basic, below basic, just above basic. But I don't think we have a ton who are beyond proficient. And I think, I think the expectation is that, well, we should be here. Well, I get that, but we're gonna have to help them get there. So, I think the contemporary math maybe was put in as kind of a stopgap for that (second interview, 221209).

Here, in drawing upon accountability language to allude to the sequence of mathematical learning—from "basic" to "proficient"—the director explained that the district created contemporary mathematics to support students who perform at or below basic to move up the "levels." This interdiscursivity—traces of accountability discourses in discourses about the mathematics as linear— reveals how this tracking structure implicitly enacted discourses about the sequentiality of mathematics. That is, contemporary mathematics and other "lower-level" courses were only necessary under the assumption that there are "basic" students, and "proficient" students, and schools and school districts needed to move those students along this hierarchy. Moreover, by drawing on accountability, mathematical activity was equated with performance on high-stakes test. This narrow definition of mathematical activity, along with the sequentiality of mathematics, also perpetuated narrow conceptions of mathematical competence, where only some can be good at mathematics.

So, as alluded to throughout this section, discourses about mathematics as sequential and defined were oftentimes discussed together, perpetuating discourses that narrowly define mathematical activity and competence. These discourses were not explicitly written in policy texts, but were revealed through assessment, intervention, and ability grouping structures and district leaders' personal discourses during interviews. That these discourses were expressed by a majority of the interviewed district leaders and were hidden within institutionalized routines and structures throughout the district, suggests that discourses about mathematics as sequential and defined were widespread, permeating classrooms and schools, as well as district leaders' policymaking, teachers' practice, and students' experiences.

Nondominant and Competing Discourses Related to Mathematics Pedagogy

Among RiverTown district leaders, issues of mathematics pedagogy were infrequently discussed. For example, RiverTown was engaged in supporting administrators' learning of the Artisan Themes of Teaching, a set of instructional practices promoted as being applicable across all content areas. This was a frequent topic of formal professional development, facilitated by external providers, as well as conversations during district administration team meetings. These conversations rarely attended to what these instructional practices might look like in a mathematics classroom, nor the extent to which these practices align with the district's or district leaders' view of high-quality mathematics instruction.

Discourses about mathematics pedagogy were more present at STEM committee meetings and other meetings with teachers, though they were still not a primary focus. For example, during the 2022-2023 academic school year, the chief academic officer coordinated three mathematics vertical team meetings for school building principals and teacher representatives from each building, all of which were facilitated by mathematics consultants from the state department of education. While the first and second meetings attended to issues of state priority standards and assessments, only the third meeting discussed mathematics pedagogy, including how teachers might use the routine of a Number Talk to support number sense and fluency (artifacts: 221024, 221208, 230110 mathematics vertical team presentation slides).

In interviews with district leaders, issues of mathematics pedagogy were addressed, though it was primarily in relation to recently adopted mathematics curricular materials in the elementary buildings (new curricular materials—*Illustrative Mathematics*—were also adopted for grades 6-8, but this was not a source of ongoing conversation). In 2020, grades K-5 switched from *Go Math* to *Eureka Math* (artifact: Curriculum Review). The K-2 building principal, the 3-5 building assistant principal, the chief academic officer, and district instructional coach all explained that *Eureka Math* promoted different pedagogical approaches that contrasted with *Go Math* and its more "traditional model [where] teachers just really, you know, looked at the standard algorithm and taught it" (chief academic officer, interview 1, 220419) There were various descriptions of this "new" mathematics, including those that range from productive struggle and problem-solving to descriptions focused on number sense and conceptual understanding.

The most common description attended to how this pedagogical approach emphasized the use of multiple strategies beyond the standard algorithm. For example, the district instructional coach shared that "a lot of the ways the math is taught is like what you call 'new age,' you know, where we really encourage students to be able to solve math in more than one way" (first interview, 220506). While this focus on multiple solution strategies—which the publishers describe as supporting students' conceptual understanding (Great Minds, n.d.)—was likely an expansion on current mathematics instruction at RiverTown, the alignment of *Eureka Math's* design with direct instruction was consistent with the "traditional model" district leaders described *Go Math* as promoting.

It is also important to note here that these discourses about mathematics pedagogy reinforced certain discourses about mathematical activity and competence. Discourses about the importance of multiple solution strategies has the potential for a broader understanding of mathematical activity beyond just the standard algorithm for finding the correct answer, and can position more students as competent as there are more opportunities to construct and share valid strategies (e.g., Boaler & Staples, 2008). For example, the assistant principal at the 3-5 building shared that "it's really a positive, because not all students learn one way. Especially when you're looking at our special ed[ucation] students, some of our gifted students. They learn in different ways. And so when we can give different strategies to get to the same answer, they get to choose that" (interview, 221110). While the attention to multiple strategies has the potential to expand notions of mathematical activity and competence, mathematical learning was not necessarily seen as being about sensemaking, collaboration, and argumentation; nor was it related to developing mathematical authority or positive mathematical identities—issues of identity or power.

Despite *Eureka Math* promoting "new" mathematics, mathematics instruction in RiverTown was still "traditional" instruction focused on memorization and procedures. The superintendent shared that:

> I hear a lot of conversation in the three through five building about not memorizing the facts like they [students] should. So I think reverting back to 'this is the way we've always done it' or 'these have been traditional teaching practices, where you memorize your mathematics facts.' That's one of the concepts I hear a lot (first interview, 220411).

Here, the superintendent explained that mathematics instruction in RiverTown was still "traditional" with a focus on memorization and recall of procedures. The chief academic officer, district instructional coach, PK-2 building principal, and 3-5 building assistant principal similarly shared that an ongoing challenge for RiverTown has been supporting teachers, and families, to understand and implement mathematics pedagogical approaches that are different than those they have previously experienced. This suggests that there were competing discourses about mathematics pedagogy, where discourses that, to some extent, reflected more ambitious forms of mathematics instruction were encoded in formal curriculum materials, while discourses that align with more traditional mathematical learning goals were enacted through teachers' instructional practices and emanate from social narratives and individuals' personal experiences.

Not only were there competing discourses related to mathematics pedagogy, "new" mathematics discourses were not robust, as they were adaptable and susceptible to discourses about mathematics as sequential. Specifically, teachers and district leaders saw *Eureka Math* as compatible with within-class ability grouping practices. For example, the

PK-2 building principal explained that within-class ability grouping fits within *Eureka Math* because:

> I think that there are pieces that are certainly like for whole group or independent practice, but no, I think that it can be easily adapted so that you can take that whole group concept and really teach it to just a smaller group of students. I know that sometimes there might be, you know, three or four strategies that are introduced. And so maybe, you know, introducing all of those strategies, but if there are students who are struggling to master all four of them, then let's start, this group's going to work on this one strategy and then build from there, at a level, different pace.

Here, the importance of learning multiple strategies was compatible with the idea of mastery and ability grouping, so that students who are "struggling" can be provided supplemental instruction on specific strategies, potentially at a "different pace." It is important to note here that the focus was on form—students learning multiple solution strategies—and not necessarily the function of that form—students' conceptual understanding—which served to reinscribe and preserve ability grouping practices. This aligns with what Spillane (2000) described as district leaders reconfiguring new means to a familiar end. Indeed, both the sequence of mathematics learning—needing to master all the strategies before moving on—and the sequence (or hierarchy) of student competence—students who are "struggling" and students who are not—were present, and interacted with discourses about multiple strategies. This suggests that not only were discourses about multiple solution strategies adaptable, but also that discourses about the sequentiality of mathematics were powerful, able to co-opt other discourses.

In short, at RiverTown, discourses about mathematics pedagogy were nondominant, infrequently employed by district leaders during leadership and policymaking. When mathematics pedagogy was the topic of conversation during interviews, it was primarily in relation to newly adopted K-5 curricular materials. While these official curricular texts encoded discourses about the importance of learning multiple solution strategies, they competed with discourses about recall and procedures that were reflected in teachers' instruction and individual's personal experiences. Moreover, these discourses were susceptible to discourses about the sequentiality of mathematics.

Contested Equity Discourses, Constrained to Access and Meeting Students' Needs

At RiverTown, there was a lack of explicit attention to "equity"—in general and specific to mathematics—in official policy texts and official policy discourse. For example, the terms "equity," "diversity," and "inclusion" did not show up at all in the district's continuous improvement plan (updated November, 2022). Moreover, when asked questions about challenges related to equity, five of eight interviewed district leaders explained that there are not yet any identified by the district. The chief academic officer shared that: "I think it's something we're always trying to be conscious about. I don't know that we have really developed a full equity plan yet. I think we're trying to get some of this other stuff, but I think that that's always in our background of what is equity and what does it look like with our students." Here, the chief academic officer explained that not only was equity not currently being addressed at RiverTown, it was also unrelated to "other stuff," which, earlier in the interview, was described as including instructional coaching, intervention, and standards-based grading. This suggests that equity discourses were not dominant, and also unspecific to (mathematics) instruction.

Though three participants described their own personal observations of a lack of diversity—in both the teacher population and in student representation in certain courses—supporting diversity and inclusion was not something the district was explicitly working to address. In part, this was because there was a lack of community desire or support for such efforts. One building principal stated that “our staff is not probably a rep- like the same representation as our population, which I think that's always, you know, a goal, is to have- kind of have those balances within a school community. But I don't know that it's something that people complain about a lot, either” (first interview, 220511).

Not only was there a lack of community desire for equity efforts, it was also, according to the superintendent, frowned upon. The superintendent shared that:

> As long as we're not talking about something, then we're fine. I mean, that's just them [the community]. We're just, that's the perspective that I get from a lot of community members is, we're just, that we're not talking about that here….No conversation. We don't want to talk about critical race theory. We don't want to talk about, we don't want that conversation in our school (second interview, 221207).

Here, the superintendent described that the community does not want the district to engage in conversations about equity, and in particular, “critical race theory.” Because “equity” was controversial, the district was not explicitly taking it up.

At the district administrative team meeting on March 22, 2022, the superintendent also alluded to community discourses about equity when describing her recent experiences at a conference:

> Dr. Campbell also stated, and this hit as well to me, there's a bit, unless you live under a rock, you're aware that there's a very divisive perspective in our world on equity and what that means, and CRT, and all of these very charged topics. She made a point though that leadership and equity are synonymous, especially in public education. Because as leaders we want to provide equitable educational opportunities for all our kids.

Here, the superintendent suggested that "leadership and equity are synonymous," while simultaneously distinguishing between "divisive" equity topics (e.g., CRT) and "providing equitable educational opportunities for all kids." This served to justify district engagement in some sort of thinking about equity (i.e., access for *all* students), while also rationalizing not engaging in contentious initiatives. It is important to note here that the equity issues that were controversial in RiverTown are those related to issues of identity and power. This suggests that, at RiverTown, discourses about educational equity were present, even if they may not be explicitly framed as "equity." Such discourses were, however, limited to notions of access.

That equity was understood primarily in terms of access was widespread throughout RiverTown. This is most obviously represented in the district self-assessment (shared at the January 12, 2022 board meeting). In the 31-page document, I coded 15 instances of equity-related discourses, 13 of which focused on issues of access, meeting students' needs (more on this below), as well as achievement gaps. The two other instances were in reference to implicit biases, specifically that the "district has not yet conducted work to evaluate implicit biases or system inequalities." Attention to access in the district self-assessment included statements such as these:

- "resources (including funds, staff, materials, and scheduling) are allocated equitably to schools and programs to ensure improved performance, opportunities, and outcomes for all students, with an emphasis on closing achievement, access, and opportunity gaps"
- "curriculum implementation is consistent within and across classrooms and schools. It is based on individual students' needs and strengths"

Though not engaging in the interrogation of individuals' personal biases and systemic sources of inequity, RiverTown was concerned about inequitable access. As alluded to, this most often manifested in the form of "meeting students' needs." Discourses of meeting students' needs were prevalent throughout the district, employed by all interviewed district leaders, and in reference to a variety of different needs, including:

- *academic needs*, supported through intervention, tutoring, advanced placement (AP) and dual credit courses, and special education services;
- *physical needs*, like access to food, essentials, and medical care, which were provided through community partnerships; and
- *social-emotional needs*, addressed through the district behavior specialist, trauma-informed care, access to mental health services, and a focus on safety and students' sense of belonging.

One principal provided some context for why meeting students' needs was important for the district:

> Prior to about 2008, the [RiverTown] School District, we only had about 30% of our students qualify for high poverty, free reduced lunch. There were eight or nine different factories that were here in [RiverTown] and provided a robust middle-class income for families and so we were working with just general, a middle class mentality values clientele. Those factories closed and were, a lot, most of them moved offshore, you know, to a different country. Our current population is about 80% free and reduced lunch, so we've seen this dramatic demographic shift in regards to economics. And while economics should never predict a child's academic success, unfortunately, the barriers that are created by poverty do, oftentimes, and so I think, we've had to devote a lot more resources in the last several years to the bottom 25%, in regards to academic performance. And now we're having to go back and reshift, so we also honor our upper-level students. And so when we say 'all means all,' really making sure that from our most challenged learner to our highest learner, that we're providing what they need.

Here, the principal connected discourses about meeting student's needs to discourses of inclusion (e.g., "all means all"), the latter of which was also previously alluded to by the superintendent. Simultaneously, the principal attended to students' identities and the district student population primarily with respect to class, ignoring race. Though small, RiverTown's student population was almost 20% students of color, the majority of which were Black students. Four district leaders explicitly discussed the ways in which the greater population of poor students has resulted in additional "needs" that RiverTown should be attending to. While some of the principal's talk here points to structural problems (e.g., loss of local business) and the "barriers that are created by poverty," by attending to “a middle-class mentality values clientele,” she suggested that the barriers are part of the students’ and families’ identities. In other words, the “needs” that have emerged are directly related to students’ and families’ values and culture. These needs are then “met” by the district providing different resources to different groups of students, depending on their academic performance.

These discourses focused on meeting students’ needs penetrated into the content areas, including mathematics. This manifested primarily in the meeting of students’ academic needs through intervention systems, tutoring, new curricular materials, and advanced courses. This was, however, the extent to which equity-related discourses in mathematics were employed by RiverTown district leaders and enacted in policy texts. In particular, there was a lack of interrogation of more systemic and structural inequities related to mathematics. For example, neither the middle school’s Targeted status (from state accountability policies) for low achievement scores for their Black students and students identified as having an IEP (artifact: notice from Missouri Department of Elementary and Secondary Education), nor the district’s tracking/ability grouping practices in mathematics, were identified as problematic and needing addressing. Though official policy texts did attend to issues of achievement gaps, in reality, it was not being explicitly addressed. For example, the principal explained that:

> When you get Targeted, sometimes it's a specific group of students that score low and I, also, I think maybe that’s the case for [the middle school]. And I don't remember if it was the free and reduced kiddos because we have quite a bit, so it might be that that targeted group. So then, you also have to look at other things like outside of school or you know representation of certain students in our school

> and trying to figure out like how to help them be successful. Which is a little outside the box, but we have some big pieces to do like the reading before we can even get into like specific.

Here, the principal mis-remembered the identified "Target" group as being students receiving free and reduced-price lunch, and also suggested that contributing to low achievement were "outside of school" factors, possibly alluding to the historical context that the high school principal described. She, however, dismissed disproportionality in achievement as being a district "problem" worth solving, as the focus on supporting reading instruction was greater.

Overall, discourses explicitly about equity were not encoded in formal district policy texts nor employed in policy talk, because equity was controversial and undesired by the community. There was, however, attention to issues of access and meeting student's needs, particularly in relation to poor students. These discourses were frequently employed by district leaders, in a variety of capacities to talk about academic, physical, and social-emotional needs. In mathematics, discourses related to equity were limited to such concerns of access and needs, and not attending to inequitable outcomes nor structures.

Interdiscursivity with Accountability Discourses

As alluded throughout, discourses often interacted with one another. The most common manifestation of interdiscursivity was the presence of accountability discourses with mathematics-specific discourses. First, accountability discourses were often employed to rationalize mathematics and ELA as the most *core* subjects. The heavily tested nature of mathematics and ELA was acknowledged by all interviewed district leaders, and performance on standardized assessments was prioritized in formal policy texts and district efforts. This included Missouri annual standardized tests, as well as the ACT, SAT, and career and technical education credentials and assessments. So, the focus on accountability penetrated the upper elementary, middle, and high school buildings, as well as the technical education center. Even at the lower elementary building, “we talk a lot about how what we do here has to prepare them for that [standardized testing] in third, fourth, and fifth grade, and as they continue to progress” (principal of PK-2 building, first interview, 220511).

These standardized assessments, as well as the content standards these assessments ostensibly test, were enacted in official routines and structures, like mathematics vertical team meetings, data-based decision-making, intervention, and tracking. To support students in performing on standardized tests, teachers need to understand the content standards, and how these standards are assessed. This was the focus of the first two mathematics vertical team meetings for the 2022-2023 academic year. For example, in the meeting on October 24, 2022, teachers and administrators were engaged in learning about the state’s performance level descriptors for the annual standardized tests, which describe the knowledge, skills, and abilities expected at “below basic,” “basic,” “proficient,” and “advanced” levels. Understanding this would then support teachers to make sense of “how are you going to move students from BB[Below basic]/Basic to Proficient/Advanced” (artifact: 221024 math vertical team presentation slides). Here, the language of accountability and discourses about the linearity of mathematics together blended together and functioned to construct a *sequence* of mathematical learning, as well as a hierarchy of students and their mathematical competence.

To track students' progress along this sequence, RiverTown engaged in data-based decision making. This was employed to inform instruction, as well as intervention systems and tracking structures. Here, high-stakes tests were used to *define* what counts as mathematical competence, and therefore which students were considered mathematically smart. Because such seemingly objective quantification abstracts and translates mathematical learning to numbers (e.g., test scores), this was compatible with discourses about mathematics being well-defined and agreed upon.

These measures were used to determine which students were placed in the higher mathematics track, and which students "need" intervention and additional attention. For example, the district instructional coach explained that mathematics tutoring was only for certain students, and students were identified through:

> look[ing] at the assessment data for students as well in ELA and in math….They look at, okay, what students fit into those categories, because there's not enough teachers or room for every single student to receive tutoring. So they try to focus that list on the students that have the most need (second interview, 221216).

Here, accountability discourses through the focus on assessment data were present with discourses about students' need, and together determined what the need was (i.e., low test scores) and which students had that need, as well as the end goal of "need-meeting" (i.e., high test scores). As such, accountability discourses narrowly constrained "need-meeting" in mathematics, and considerations of equity more generally, to academic achievement, and not, for example, students' identities and experiences in mathematics.

Accountability discourses were hegemonic and permeated several facets of RiverTown policymaking. They reproduced at various levels, and were encoded in official policy texts, employed in district leaders' talk and policymaking, and enacted in efforts and routines. The interdiscursivity of accountability discourses with mathematics-specific discourses functioned to: reinforce mathematics (and ELA) as the most *core* school subjects; construct *sequences* in which mathematical learning (and students) progress; *define* mathematical activity and competence; and narrowly constrain *need-meeting* and equity to achievement.

Summary

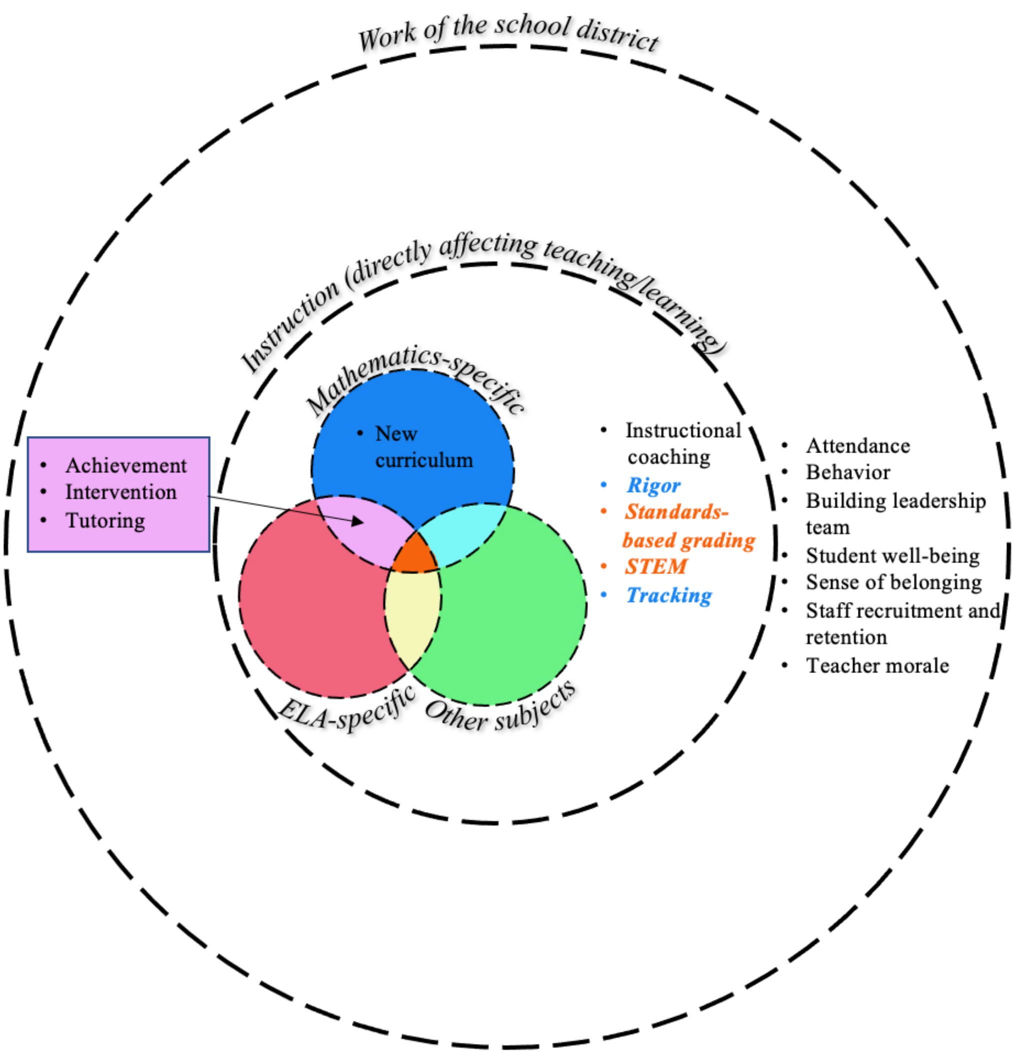
At RiverTown, the mathematics subject-matter context (SMC) was characterized by explicit and visible discourses about mathematics as core, as well as implicit discourses about mathematics as sequential and defined, which were ingrained in longstanding tracking structures, and intervention and data-based decision-making routines. Infrequently employed were discourses related to mathematics pedagogy, as well as discourses explicitly about "equity," especially those related to issues of identity and power (e.g., "critical race theory"). By contrast, discourses about access and meeting students' needs were prevalent. Intersecting throughout were also accountability discourses, as well as discourses about mathematical activity and competence.

RiverTown's Policy Boundaries

In investigating RiverTown's boundaries of mathematics education policy, I found that there were other policy boundaries operating as well. Because policies for mathematics were framed and negotiated in relation to these other boundaries, it is important to understand these other boundaries and how they were defined. Figure 4 represents the various policy boundaries operating in RiverTown. Boundaries are represented by dashed circles, with the boundary's title italicized.

Figure 4

Policy Boundaries at RiverTown



The largest boundary labeled "work of the school district" represents the domain and responsibility of the school district. So, what falls inside this outermost boundary were various policies and efforts (i.e., what is in the bullet points,) that RiverTown and its district leaders were engaged in to support education broadly. See Table 3 for a description of each policy, and how policies were encoded in official policy texts and/or constructed through discourse. The middle "instruction" boundary included subject-neutral policies and efforts that *directly* affect classroom teaching and learning (e.g., instructional coaching, standards-based grading), and distinguishes from other efforts that *indirectly* affect instruction (e.g., attendance, behavior, staff recruitment and retention). These efforts that only indirectly affect instruction fell outside the "instruction" boundary, but still within the policy boundaries of the school district. Inside this "instruction" boundary were also subject-specific boundaries, including boundaries for mathematics, English language arts (ELA), and other subjects. These subject-specific boundaries included policies and efforts only for that subject. And, the pink intersection between mathematics and ELA included mathematics and ELA-differentiating policies, denoted in Figure 4 by the pink box. Sometimes, subject-neutral policies that directly affect instruction *crossed* into specific content areas, which is represented in Figure 4 by the names of these efforts being italicized and color-coded, to reflect the crossing of the efforts into the (blue) mathematics-specific boundary or the (orange) intersection of all content areas.

A quick note about the layering of boundaries: smaller, inner boundaries fall within larger, outer boundaries. For example, the "instruction" boundary falls within the outermost "work of the school district" boundary, meaning that efforts that directly affect classroom teaching and learning (inside the instruction boundary) are also within the scope and domain of the school district. Likewise, inside the instruction boundary are subject-specific boundaries, in that policies that are only for some subjects, are also about policies that directly affect classroom teaching and learning. These three boundaries are discussed in the three subsections that follow.

Table 3

Description of RiverTown's policies

Policy	Type	Description
"Achievement"	Problems and solutions encoded in official policy text (i.e., CSIP), and enacted via practices	Problem of student achievement in mathematics and ELA.
"Discipline"		Problem of discipline. Solutions included behavioral specialist, new safety policies (e.g., drug tests; no phones), and training on trauma-informed care.
"Staff recruitment and retention"		Problem of recruitment and retention for certified teachers and other staff. This includes supporting novice teachers.
"Standards-based grading" (SBG)		K-5 grading based on students' mastery of skills and understanding. Implementation included developing priority standards and proficiency scales.
"Rigor"		Efforts to increase Advanced Placement and dual credit courses at high school.
"STEM"		Efforts to increase STEM opportunities for students, including the adoption of *Project Lead the Way* materials across the district.
"Student well-being"		Efforts to support students' access to physical resources (e.g., food, hygiene products) and mental health services (e.g., counseling; trauma-informed care).
Attendance	Problems constructed through discourse; solutions enacted via practices	Problem of attendance. Solutions included incentives and interventions that paired identified students with a teacher.
"Sense of belonging"		Efforts to support students' sense of belonging, where students feel like a member of the school or district.
Intervention	Solutions enacted via practices	Reading intervention for all K-5 students, and identified 6th grade students. Mathematics intervention for identified 9th-12th students.
Tracking		Separating students who take advanced courses from students who take grade-level courses. Mathematics has the most and earliest acceleration opportunities.
Tutoring		Tutoring in mathematics and reading, for students identified as needing support.
"Building leadership teams"		Development of new leadership teams at each building, composed of teachers and led by building administrators.
"Teacher morale"		Efforts to support teacher morale, through partnering with an education consulting firm.
Instructional coaching	Solution enacted via practices and position	Efforts from the district instructional coach, and efforts with *Artisan Themes of Teaching*, a set of instructional practices applicable across all content areas.
Curricular materials	Solution encoded in text (i.e., textbook)	Adoption of new mathematics curricular materials for grades K-8, including *Eureka Math* for K-5 and *Illustrative Math* for 6-8.

Note: Quoted policy labels are the district's. Otherwise, they are the researcher's.

Boundaries Defining the Work of RiverTown School District

This boundary emerged during my graphic elicitation interviews with district leaders. The initial representation that I shared and invited participants to interact with did not include this boundary. Rather, it surfaced as district leaders (four of seven interviewed) explicitly or implicitly referred to issues that were not under the district's domain. This then allowed me to probe on district leaders' perspectives on what is (not) included within the district's scope.

Defining the district's policy boundary, and what efforts were included, were two main criteria. First, is it within the district's control? For example, issues of student behavior and discipline were under the domain of the school district, as some incidents occur during school hours and on school property. However, the causes of the behavior challenge, according to RiverTown district leaders, include the COVID-19 pandemic and issues of mental health, which, in their view, are exacerbated by social media and increasing phone use. These factors were outside the control of the district because they originate or happen in the home, and therefore, outside of school hours and off school property.

According to the superintendent, political factors also shape education but are outside of the district's control, and therefore outside their policy boundaries. She explained that:

> I think you could probably put outside the circle influence[s] but we don't have necessarily control over. Like legislative mandates. They definitely influence what we do. But we don't have any control over why we're doing them or how we're doing them. Or if we do them. So I think like legislative pieces are outside.

> A lot of political influences as well. And when I mean political, I mean, like parent dynamics, controversial topics. All of that aggressive conversation that really, you know, really overshadows teaching and learning.

By political and “controversial topics,” the superintendent was referring to issues of equity, especially “critical race theory.” In describing these issues as “overshadowing[ing] teaching and learning,” she suggested that they are separate entities (i.e., not teaching and learning). Here, the boundary framing was clear: rhetoric about “critical race theory” and related ideas fell outside the district’s policy boundaries. In part, these political influences were outside the control of the district, but also because the community did not want these ideas inside the schools, as described earlier.

Perspectives on what should and should not be inside schools raise questions about the purpose of schooling and the district’s role. This leads us to the second criterion for framing the district’s policy boundary, and what policies and efforts were included: is it the district’s role and responsibility? For the PK-2 building principal, the district’s current role was related to the historical purpose of schooling, and the negotiation of responsibilities in adapting to new world conditions. She explained that:

> The historical purpose of school is to teach kids about reading, writing, math, science, social studies. But as our world has changed, schools are now also responsible for doing more teaching for behavior, student wellbeing and mental health, for creating that sense of belonging. And so, I think that those are a little bit newer to education. And there's still many, many outside factors that impact those.

Here, the principal explained that there were still "many outside factors" that fell outside the district's policy boundaries, but in addition to things that have always fallen onto schools, such as supporting students' learning of the core content areas (i.e., reading, mathematics, science, social studies), the district's current domain also included newer responsibilities like issues of behavior, student wellbeing and mental health, and sense of belonging. In discussing the changing role of schooling, she suggested that these policy boundaries are dynamic, and that they can and have shifted and expanded over time. Moreover, by distinguishing between the historical purpose of education (i.e., content area instruction) and newer school responsibilities (e.g., behavior, mental health), the principal alluded to another boundary delineating efforts directly related to instruction, and other efforts.

Boundaries around Instruction

In the quote above, the PK-2 building principal referred to a boundary demarcating content area instruction from newer responsibilities of the school district, like issues of behavior and mental health. This is represented in Figure 4 by the middle "instruction" boundary, which encapsulates district-wide efforts that *directly* affect classroom teaching and learning (e.g., instructional coaching; STEM; rigor). Falling outside this middle boundary were efforts perceived to *indirectly* affect instruction, such as issues of attendance, behavior, students' well-being and mental health, and sense of belonging. The director of the technical education center summarized this boundary as: "they're almost to me, kind of opposite sides of the spectrum. So here are the things [outside of boundary] that we're seeing that are not really related to teaching and learning. And then these are the things [inside the boundary] that are related to teaching and learning" (interview 2, 221209). For example, RiverTown's chief academic officer explained that:

> when kids aren't there, I mean, it impacts. I mean, what we struggle with intervention is kids are late every day. The time we have intervention, they're missing that. You know, behavior. If your behavior's not under control, you're not learning. So it helps, it really impacts achievement (interview 2, 221213).

For the chief academic officer, attendance and behavior impacts student learning and achievement, because students cannot learn if they're absent or unengaged. In other words, they are indirect factors to classroom teaching and learning.

In framing this boundary, and distinguishing whether something directly or indirectly affects instruction, three RiverTown district leaders explicitly discussed how efforts that indirectly affect teaching and learning need to be addressed prior to or before effective classroom instruction can occur. Specifically, two drew upon ideas of Maslow's hierarchy of needs. For example, the high school principal discussed efforts that fall outside the instruction boundary:

> I think without each of those, like, each of those things being addressed, you don't get quality instruction on the inside of the [instruction] circle, right? Like if we don't have, you know, students in attendance, if we don't have quality behaviors of our students. If our students don't have their Maslow's hierarchy of needs being met, then the rest of this work isn't gonna matter. And so you have to invest time and energy and wellbeing into those other areas so we can maximize the instructional time we have our students. I would say, they're like very foundational, right? Like they're like, if it's a pyramid, like these things on the

> outside the circle are the foundational building blocks so we can do this other work [on the inside] (interview 2, 221210).

Here, arguing that indirect efforts are necessary for—but need to be addressed prior to—quality classroom teaching served to position such efforts as the work of the school district, but outside the instruction boundary.

Within the larger instruction boundary, but outside of the subject-specific boundaries were efforts that broadly affect instruction, across all the content areas. At RiverTown, this included instructional coaching, standards-based grading, tracking, and efforts to support STEM and rigor. These were subject-neutral, in that they treated all subjects equally, or ignored subject-matter. For example, the district instructional coach's efforts to support teachers and their instruction attended to practices that cut across all the content areas. She explained that:

> I sent the teachers a survey to ask them what are some things that they want to work on. And like for this school year, I gave them like a small list to choose from… I tried to pick things that were more general to teaching, so like formative assessment was one of them. Classroom management, student engagement, instructional strategies, or I think I only had four to five things. One of them was lesson planning (first interview, 220506).

For her, these practices were all "general to teaching," so they ignored the subjects that teachers teach and treated them as not relevant to supporting instruction. Likewise, her monthly newsletter included instructional strategies that could be used across subjects and grades (artifacts: coaching newsletters).

While coaching and other efforts were subject-neutral, some efforts crossed into specific subjects. This occurred when some subjects were prioritized (e.g., tracking in mathematics) or there was work being done to support subject-specific implementation (e.g., standards-based grading). For example, to support standards-based grading, teachers, with the support of the chief academic officer, were developing proficiency scales and priority standards in each content area. In Figure 4, this is represented by the names of these efforts being italicized and color-coded, to reflect the crossing of this effort into the (blue) mathematics-specific boundary or the (orange) intersection of all content areas.

Subject-Specific Boundaries

Falling inside the "instruction" boundary were subject-specific boundaries. Specifically, there was a mathematics-specific boundary that included policies and efforts only for mathematics, such as new curricular materials. Likewise, there was an ELA-specific boundary for policies and efforts only for reading, writing, and English language arts. This was a finding that emerged early in my data collection: mathematics and ELA were the prioritized subjects in RiverTown, and were the target of subject-specific and subject-differentiating policies, including intervention, tutoring, and the focus on achievement. These two subjects were the recipients of additional attention and resources. When efforts were for both mathematics and ELA, and not other subjects, they fell within the intersection of the two subject's boundaries, represented in Figure 4 by the blue intersection and associated blue text. By contrast, science, social studies, and other less core subjects were less prioritized, and represented in Figure 4 with the "other subjects" boundary.

While the "work of the district" and "instruction" boundaries were bright—they were explicitly and clearly defined—the boundary of mathematics education policy was more implicitly defined. That the policies inside the boundary, including new curricular materials, intervention, and tutoring, were rationalized as directly addressing mathematics (and ELA) achievement suggests that achievement was a criterion that determined in-group status. In other words, for a policy to fall within the mathematics boundary, it must, in part, *directly* address achievement, and specifically target mathematics as a priority subject area. And, efforts that do not directly address mathematics achievement fall outside the boundaries. For example, as described earlier, efforts to support attendance, behavior, etc. fell outside the boundaries of mathematics education policy because it was perceived to only *indirectly* affect classroom teaching and learning. Likewise, instructional coaching was subject-neutral and did not prioritize any subject area.

Boundary Framing and the Mathematics Subject-Matter Context

In this section, I consider how the mathematics subject-matter context (SMC) shaped the framing of the policy boundaries just described. In so doing, I refer back to the dominant discourses about school mathematics, as well as interdiscursivity with accountability discourses, that were discussed earlier in the chapter. I found three main mechanisms through which the mathematics SMC shaped boundary framing. First, the mathematics SMC provided discourses that constructed achievement as the criterion for determining what falls within the boundaries of mathematics education policy. While this brightly defined the boundary, there was still negotiation over whether particular policies fall inside or outside the boundary. Constituting the second and third mechanisms were the ways in which mathematics SMC shaped crossing of subject-neutral policies into the boundaries of mathematics education policy. Specifically, the mathematics SMC provided discourses that: 1) supported the crossing of subject-neutral policies into the mathematics boundary; or 2) delegitimized a mathematics-specific form of a subject-neutral policy.

To illustrate these three boundary framing mechanisms, I focus on key policies and efforts that RiverTown engaged in, paying particular attention to policy designs and enactments at the district leader-level. Specifically, I consider how mathematics-specific discourses shaped the ways policies were framed alongside the different boundaries discussed in the previous section. I begin first with describing how mathematics-specific and mathematics-differentiating policies inside the boundaries of mathematics education policy met the criterion of achievement. Then, I discuss how mathematics-specific discourses shaped the crossing of certain subject-neutral efforts focused on instruction into the boundaries of mathematics education policy, followed by the non-crossing of efforts that indirectly affect teaching and learning (outside the instruction boundary, but within the district's scope and domain).

Mechanism 1: Achievement as Criterion for Mathematics-Specific and Mathematics-Differentiating Policies

At RiverTown, mathematics and ELA were the core school subjects, and therefore, the target for subject-specific and subject-differentiating policies, like intervention and tutoring. These policies explicitly supported achievement, where achievement was a "problem" according to different data sources, including state and internal assessments. According to the district instructional coach:

> We have seen with like MAP [Missouri Assessment Program] scores and like EOC [End of Course] scores. I'd say MAP scores mostly and through our like district wide assessments that we have, like we use Evaluate to assess ELA and mathematics, that we have seen a, we've seen a trend in some of those standards that we teach for math and ELA to be lower than others, and so those help us identify areas for growth. Like for MAP testing, you know, we can see the number of students that are scoring at below basic, basic, proficient, or advanced. And when you have a large number of kids scoring in a certain level in ELA or math, that makes you think 'okay, well then maybe we need to make that an initiative.' To help boost those scores (interview 1, 220506).

As explained earlier in the subject-matter context section of the findings, standardized assessments, emanating from both state accountability policies and internal district programs, positioned mathematics and ELA as core subjects because they were the most tested. This served to establish the subjects as the targets for data-based decision-making practices. According to the district instructional coach, data on the number of students who are on the "basic" end of the sequence of mathematical learning indicated to the district the content standards that are "areas for growth." Such growth was defined as "boost[ing] those scores," where improvements in test scores was the goal and objective of district "initiatives."

In the quote above, the interdiscursivity of different discourses—blending of accountability discourses and discourses about mathematics as core and sequential—functioned to define the boundary of mathematics education policy around the problem of mathematics achievement, where solutions (e.g., curriculum materials intervention, tutoring) for the problem were framed as falling within the boundary of mathematics (as well as ELA), and outside the boundaries of less tested content areas. In the following sections, I use the examples of curriculum materials and intervention to illustrate how these efforts met the criterion of achievement, and therefore was legitimized as the target of subject-specific and subject-differentiating policies.

Curriculum Materials. In 2020, the elementary grades at RiverTown adopted *Eureka Math* as their new mathematics textbook. As explained earlier, several district leaders described these curricular materials as promoting "new" mathematics, where students are encouraged to learn multiple solution strategies. These discourses related to mathematics pedagogy were perceived by district leaders to contrast with the focus on procedures and recall, especially the standard algorithm, enacted in RiverTown's previous textbook, *Go Math*. Though district leaders acknowledged this pedagogical shift, this was not the motivation for adopting new curricular materials.

Rather, RiverTown adopted *Eureka Math* to address student "gaps" and "needs." For example, the chief academic officer explained that, when picking new curricular materials,

> We were looking at number sense. We felt like number sense, we really needed to focus on that, especially in our younger grades. Just being able to solve word problems and figure out, looking at various components and data and understanding that, we wanted something that hit upon fluency some and. I think those are the main things we saw. Number sense was really big with our, that we noticed our kids needed (interview 1, 220419).

Because number sense and fluency were what students "needed," the district selected curricular materials that, in their view, would support those needs.

The district instructional coach elaborated that these needs were identified based on state accountability data:

> I remember, at one point hearing, and I think just talking with [the chief academic officer], that we weren't seeing the growth that we needed to see with MAP scores. And so it was kind of a natural transition to, the contract was ending, we weren't seeing the growth we wanted to see. And so we decided to shift to a new curriculum (interview 1, 220506).

Here, the district instructional coach explicitly rationalized the adoption of new curricular materials due to lower than desired standardized test scores. As with the chief academic officer's quote, the focus on "growth" and "needs" detracted attention away from the "new" pedagogical approaches implicit in *Eureka Math*, and suggested that the curricular adoption was not motivated by a desire to move to potentially more ambitious forms of mathematics instruction. Moreover, by quantifying (and reducing) number sense and fluency—and students' needs related to such mathematical understanding—to performance on high stakes testing (where the focus is on accuracy), the district instructional coach implicitly enacted discourses that counter the conceptual understanding (function) that underlies the use of multiple solution strategies (form) in "new" mathematics.

Discourses about mathematics pedagogy were more present in the PK-2 building principal's rationalization of the new curricular adoption:

> Formerly we used the *Go Math* curriculum and I think that it was much more surface level and not as based in like hands-on problem solving, or like deepening, strengthening number sense. I think it was teaching students a strategy, and then they would just kind of copy that strategy, and so I think, maybe we didn't recognize some of the holes that were occurring, you know, with our students, like maybe areas that we needed to dig deeper into. And so I think we're starting to see that with *Eureka* but there's just so much to process with it and really to kind of learn, just new, like new ways to teach things, better ways for kids to like build their number sense (interview 1, 220511).

Like the others before her, the PK-2 principal described number sense as a "hole" or need. She also attributed the presence (and cause) of this need to the "surface level" instructional approaches enacted with the previous curricular materials. Then, different forms of mathematics instruction promoted by *Eureka Math* was the solution to this problem of number sense. This suggests that discourses about mathematics pedagogy were present, but only influential if they aligned with and supported the district in addressing achievement.

This limited role of discourses related to mathematics pedagogy was also reflected in official policy texts, like the RiverTown Curriculum and Instruction Guide, which was presented at the February 22, 2022 board meeting. This guide included a phased model for curriculum development (see Figure 5). As described in phase 2, adoption of a new curricular resource was informed by a "needs assessment," which was based on "state standards, student needs or district strategic plan." The Missouri state standards and RiverTown strategic plan did not discuss issues of mathematics pedagogy, and, as described earlier, issues of pedagogy were only relevant to student needs as a solution for addressing number sense and fluency.

Figure 5

Phases for Curriculum Development

CURRICULUM DEVELOPMENT

Phase 1: Needs Assessment is conducted to identify necessary curriculum revisions based on changes in state standards, student needs or district strategic plans.
Phase 2: Resource Selection process is utilized if new materials are required, as determined by the needs assessment from Phase 1.
Phase 3: Curriculum Writing team aligns assessments, instructional activities and scoring guides to the course on the Embarc website.
Phase 4: Professional Development is provided based on resource and curriculum implementation needs.
Phase 5: Curriculum Implementation involves supporting the implementation of the curriculum and instructional support materials with fidelity.
Phase 6: Monitoring and Evaluating involves administrator walk-throughs, data collection and reflection on effectiveness of the resource as it relates to the curriculum.

Overall, discourses about meeting students' needs intersected with accountability discourses to construct the problem of "gaps" and "needs" in number sense and fluency-—quantified by standardized test scores—of which new curricular materials was a solution. Discourses about mathematics pedagogy were present, but only employed to define the cause of student needs, and rationalize curricular materials as solving that need. Moving towards potentially more ambitious forms of mathematics instruction was not the goal, but the means for addressing student achievement. So, through discourses about accountability and meeting students' needs, mathematics curricular materials met the criterion of achievement, therefore falling with the boundaries of mathematics education.

Intervention for Mathematics or ELA. Although RiverTown's elementary buildings had been engaged in intervention for several years, only recently did the district partner with education consultants to create a systematic approach for reading intervention and data teams in the two elementary buildings, and continue that support through the middle school (observation: 221010 elementary administrative team meeting). This newer, district-wide focus on intervention seemed to be initiated by the superintendent. She explained that while most district-level decisions are made through consensus as an administrative team, with teacher input, engaging in intervention and data teams was a top-down decision she made: "I had to be a bit more top down…I had to say 'this is what we're doing as an administrative team and here's why. You need to do it'" (interview 1, 220411).

For the superintendent, intervention was important because "we need to start really looking at what our kids need" (interview 1, 220411). Similarly, the chief academic officer explained "that was kind of part of our strategic plan, just trying to make sure that that we are going to meet the needs of all of our kids, like not just some portion of them, but I feel like we felt like data teams and RTI was a way to kind of make sure we are not missing any kid" (interview 220419). Overall, seven of eight interviewed district leaders employed discourses about meeting students' needs to rationalize the district's engagement in intervention. As explained earlier, intervention and data teams employed standardized assessments, and these data sources determined what the need was (i.e., low test scores), which students had that need, as well as the goal of "need-meeting" (i.e., high test scores) As such, accountability discourses narrowly constrained “need-meeting” to the problem and solutions of achievement.

Throughout RiverTown, intervention targeted either literacy/reading or mathematics. There was no district-wide policy, so intervention was separately determined for each building. Overall, at each building, the subject that was the focus of intervention depended on where leaders and teachers perceived to be “gaps” and “student needs,” as well as how core mathematics and ELA are, especially in relation to each other. In the following, I describe how this manifested in each building.

At the PK-5 grade levels, reading was the target of intervention policies (including Title I services; observation: 220413 board meeting) because literacy was most core and where there was the greatest “need,” which was indicated by accountability data. At the PK-2 grade levels, the building principal shared that “literacy is kind of where we see our biggest deficits. And so that’s one reason why we have focused that specifically on literacy” (interview 2, 221207). Moreover, she explained that there was no intervention for science or social studies because “it’s more exposure, rather than mastery at this level. A lot of [science and social studies] concepts that are introduced are reintroduced later on, at some point in you know, third, fourth or fifth grade” (interview 1, 220511). This suggests that ELA, by contrast, is about sequential mastery, and therefore, intervention can support students’ learning in this subject, as more complex topics build on this early mastery.

Though literacy was the “biggest deficit” (PK-2 building principal, previous quote) in the early grades, mathematics was perceived as a growing need starting in second grade. According to the PK building principal, “there were some students who had those needs, starting to really [appear] by the time. They couldn't transfer those early numeracy skills into some of the harder content areas or, you know, subject matter that they do in second grade" (interview 1, 220511). The superintendent similarly explained that "everybody's kind of tracking well together and then, you know, third, fourth, and fifth grade, we start to see that splintering off where maybe larger groups of students are starting to struggle, or math in general just becomes harder for other students" (interview 1, 220411). Despite these growing needs in mathematics, literacy was also the focus of intervention at the 3-5 grade levels because it was perceived to be important for learning other subjects. For example, the 3-5 building assistant principal explained that "the main reason we decided to do reading is we've looked at our MAP scores. And that's one focus that we really need to work on. Because really, if you can read, you can do the other subjects" (interview, 221110). So, high-stakes testing indicated to the district where the "needs" were, and this prioritization of reading aligned with discourses about ELA as core, where ELA skills and knowledge transfer to other subjects.

At the middle school building, intervention was a newer initiative that started in the fall of 2022, and focused only on reading for 6th grade students. The October 2022 Curriculum & Instruction report to the board shared that the middle school "identified 6th graders that needed additional support. These students have spent 1st [quarter] in a systematic & explicit intervention. Students were recently progress monitored and are showing excellent growth." The district instructional coach, chief academic officer, and 6-8 building principal all explained that reading is the focus of intervention to continue providing support for students with reading needs (identified through data and progress monitoring) coming from the 3-5 building. This concern was also voiced at the 220419 secondary administrative team meeting. In addition to pull-out intervention for identified students, reading gaps were being addressed in all courses: “Every teacher and every class is focusing on that. And then in their content teams, how to incorporate the reading component” (6-8 building principal, interview 1, 220617). This included “utilizing a common writing template to promote writing in their classes” (artifact: 221019 middle school report to board).

Underlying this integration of reading instruction in all subject areas were discourses about literacy penetrating the entire school subject. This was again reiterated in explaining the focus on reading, even though the middle school was under the state’s “Targeted” status for reading as well as mathematics. The middle school principal explained that “if we can’t read, we can’t do anything else.” Not only was reading necessary for accessing other content areas, she shared that:

> I really think that if we can be very intentional about the reading interventions, that we’re going to see, maybe even as a drastic increase, but definitely an increase in performance everywhere and their behaviors…science is going to do better if the kids can read. Social studies, they’re going to perform better if they can read. So I feel like the reading intervention is going to help them in all their content areas. But math is kind of its own little, you know, piece of the puzzle (interview 1, 220617).

Here, the principal emphasized sharedness among science, social studies, and behavior (and not mathematics, more on this below) when suggesting that improving reading instruction would improve performance in several aspects of schooling. Behavior, in particular, was important for the middle school, and the district more widely, as the district was working to create a PBIS [positive behavior interventions and supports] system throughout the buildings (artifacts: district self-assessment; continuous improvement plan), even working with PBIS education consultants. The middle school, in particular, launched a new Behavior Task Force. Though the principal here framed behavior as an instructional issue (in explaining that reading instruction can improve behavior), this was uncommon among other participants. As discussed earlier, behavior was often framed as only indirectly affecting teaching and learning, and therefore fell outside the “instruction” boundary.

In the above quote, the principal also distinguished mathematics from other subjects. She further elaborated (later in the interview) that “math is kind of a separate thing because it does build, you know, so they, if they’re missing those foundational pieces” (interview 1, 220617). Here, the principal made explicit a boundary she perceived between mathematics and other subjects, in that mathematics is “separate” because it is sequential and linear. That is, reading intervention will not support mathematics learning, since only addressing “foundational” mathematics concepts will support students in learning new or advanced topics.

The high school was the only building that prioritized mathematics in terms of intervention. This was because, according to the high school principal, COVID had exacerbated “skill deficit” (based on standardized test scores) in mathematics to a greater extent than in ELA:

> Our ELA end of course exam scores, we’re almost nine points ahead of the state average and so, while there’s still room to grow, right, like, I think that data

shows that our teachers are doing a pretty good job….Our algebra one scores have some significant struggles (interview 2, 221210)

The principal gave a variety of reasons for why this might be the case, all of which pertained to the unique subject-matter of mathematics. First, there were "obvious gaps in math. But math is very black and white, so it's easy to see." Here, mathematics was understood to be well-defined ("black and white") so mathematical learning (and which students are mathematically competent) was clear and agreed upon.

Second, mathematics was more challenging for students to learn by themselves because, compared to ELA, it was less accessible:

> It is easier for students to recover missed credits like your credit recovery online in English language arts at a slower pace, than it is in math…Let's say you have to read a short story and answer questions. Well, you can use voice to text. You can do all of these different strategies to access the English language arts. You don't have that same thing, because you can't do fractions, you can't do fractions.
>
> And so I think that is why there's more of a focus in math (interview 1, 220516).

Here, the principal framed the boundary between mathematics and ELA in terms of differences in accessibility, and, therefore, policies to address the different school subjects should correspond to those epistemological differences. Specifically, to address mathematics gaps, the high school offered two "math labs," an elective students take in conjunction with their mathematics course where teachers help students with their homework or provide supplementary instruction. Because "math is unique in that one skill builds upon the next" (high school principal, interview 1, 220516), and there are no scaffolds in mathematics, students cannot be supported during their core class while teachers are introducing new content. By contrast, to address gaps in ELA, teachers retaught concepts in core ELA courses, for all students rather than specific groups of students. This is because there are "different strategies to access" the curriculum within the context of the core ELA course; there is no need for a separate space. Underlying these differences with respect to accessibility were differences in what it means to do and be "good" in the two subjects. It seems that, for the high school principal, "math is very black and white…you can't do fractions, you can't do fractions." By contrast, there are different ways to be good at reading and writing. For example, "students could read very well, but have a written expression concern. They could also have a written expression concern, or, there's just so many different lanes in which you could be successful" (interview 1, 220516).

At the high school, though discourses about mathematics as core, defined, sequential, and inaccessible, in conjunction with discourses about ELA, were powerful in legitimizing mathematics as the target of intervention, discourses about mathematics pedagogy were less powerful. Mathematics intervention, in the form of "math labs," took very traditional forms, where students with "gaps" were identified using different data sources, and offered targeted support based on those needs. While discourses about mathematics as sequential and inaccessible were influential in shaping this structure (i.e., a supplemental course that provides individualized support), discourses about mathematics pedagogy did not define what this intervention would look like. There was no explicit consideration of what high-quality mathematics instruction looks like, or the student learning opportunities that might be afforded in this sort of intervention.

Overall, in RiverTown, accountability discourses and discourses about meeting students' needs intersected to focus district leaders' attention to "gaps" and "needs" in standardized test scores. These also interacted with discourses about mathematics and ELA as core, as well as discourses about the defined and sequential nature of mathematics. It is important to reiterate here that, given the organizational structure at RiverTown, intervention was separately determined for each building, where leaders' personal discourses about mathematics and ELA interacted with dominant social discourses (e.g., accountability; meeting student needs) to shape the boundary framing intervention. Specifically, the mathematics SMC provided discourses for making sense of the problem—gaps in learning—and in which subjects this bad condition is a problem—mathematics and ELA, because they are the most core and tested. Simultaneously, principals' personal discourses about mathematics as defined, sequential, and inaccessible, and ELA as accessible, legitimized math as the focus of intervention. At the high school, intervention was for mathematics because that was where the principal perceived greater gaps, which was reinforced by ideas about mathematics as defined, sequential, and inaccessible, and ELA as accessible; discourses about mathematics pedagogy were not powerful. By contrast, in the elementary grades and at the middle school, discourses about ELA as core—whether because reading is considered foundational for young children or important for accessing and achieving in other aspects of schooling—legitimized ELA as the focus for intervention, while discourses about mathematics as sequential delegitimized mathematics intervention. So, through the interaction of various personal and social discourses, only mathematics intervention at the high school met the criterion of achievement, therefore falling within the boundaries of mathematics education.

Mechanism 2: Subject-Matter Context Facilitated Crossing of Subject-Neutral Instruction Policies

While some policies in RiverTown specifically targeted certain content areas (i.e., intervention for mathematics and ELA), many policies were subject-neutral. Some of these policies directly affect classroom instruction, while others only indirectly affect teaching and learning (e.g., attendance, behavior). The former set of policies (discussed in this section) were those that potentially cross into specific content areas, because they either prioritized some subjects over others, or there was work being done to support subject-specific implementation. For example, tracking and efforts to increase rigor prioritized mathematics (represented in Figure 4 by blue color code), while there was subject-specific implementation across all content areas for standards-based grading (represented by orange color code).

Crossing was facilitated by the mathematics SMC. For example, efforts to increase rigor through additional “enrichment courses” and “other extended learning opportunities” was a priority for the district, as it was stated in its continuous improvement plan. The high school, in particular, adopted more advanced placement (AP) and dual credit courses, where the plan was to adopt an AP course for each of the “core curriculum” subjects, which included mathematics, science, ELA, and social studies (observation: 220720 board meeting). Here, what was considered a “core” school subject legitimized the content areas that would receive additional resources, in terms of AP courses. There was a second layer of prioritization: the order in which subjects were assigned an AP course. The first AP course offered in RiverTown was AP Calculus during the 22-23 academic year. The high school principal explained that mathematics was chosen because:

> We specifically chose Calculus BC for a reason. And we chose it because the AP exam is very skill-based attainment in the math portion. So in the lit portion, in the AP U.S. history, it's very subjective about what gets covered on the test year to year. The math is very, you know, kids are going to have to be able to do these things. Where, when you are 100 multiple choice questions of any area of American history, and it can be very subjective, so we feel like we have a better chance to be successful with our students in math. And gateway math skills really do dictate whether students are successful in college or not (first interview, 220512).

Here, discourses about mathematics as core—because mathematical skills are important for college—intersected with discourses about mathematics as defined. Regarding the latter, mathematical knowledge was clearly defined because mathematical activity is "very skill based" (based on what will be tested) and this meant that RiverTown students were more likely to be successful. By contrast, literature and history are "subjective," so this deprioritized these subjects as the target for the first AP course. In fact, ELA and U.S. history were currently the last AP courses RiverTown planned to adopt (observation: 220720 board meeting). AP Physics was the next to be adopted, likely because it was a "mathematically based study of the laws and principals that govern the universe" (artifact: High School Career and Educational Planning Guide), where mathematical skills are important for science learning. As explained earlier in the mathematics SMC section, this was a second reason why mathematics was core: because mathematical skills are important and applicable to other contexts, like learning science.

To further elaborate on the ways in which the mathematics SMC shaped the crossing of subject-neutral policies into the mathematics boundary, I focus my attention on tracking. At RiverTown, there was some tracking in ELA, science, and social studies at the high school, but mathematics was (currently) the only subject to have tracking at the middle school level, and the subject with the most tracking at the high school level. As I explain in the following paragraphs, tracking crossed into mathematics the most because it was a longstanding-structure that was uninterrogated and continually enacted by discourses about mathematics as core, defined, and sequential, all of which were reinforced by accountability discourses.

Tracking in Mathematics as Uninterrogated Policy. At RiverTown, formalized tracking started in 8th grade with Algebra 1, where students, based on standardized test scores, placement exam, grades, and teacher recommendations, can be accelerated from the on-grade-level 7th-grade mathematics course to Algebra 1. This then extended into the high school, where students who took Algebra 1 in 8th grade then moved into geometry; this is the most accelerated track. All other students were then placed into Algebra 1, or Algebra 1A if they did not perform "proficient" or "advanced" on the 8th grade mathematics MAP test. Algebra 1A provided students one of their four required mathematics credits, and covered the first half of Algebra 1 topics.

The assumption behind this Algebra 1A course, according to the chief academic officer, was that:

> They [students] take the Algebra 1 content and slow it down. So basically the first semester of Algebra 1 is spread out over a full year for those kids, and then they will move into Algebra 1. It's kind of helping them get a preset to some Algebra 1, just to give them a foundation that they may not have (interview 2, 221213).

Undergirding this were discourses about the sequentiality of mathematics, where students have additional time to master the algebra "foundations" before taking Algebra I as second year students. This, however, seemed to be ineffective, as the chief academic officer continued to explain that the district was thinking about restructuring this course because:

> It just gets difficult as you move up on, making sure that they have what they need for geometry and getting all those courses in. So we were actually, we're doing a little research on what other districts are doing in their course lineup that may be a better fit…
>
> It gets them another math credit. But they're still struggling in math, down the road (interview 2, 221213).

Here, because mathematics is sequential, and there was only a support course for early algebra concepts, students continued to struggle in geometry and later mathematics courses. This spurred an examination of the effectiveness of Algebra 1A, as well as the entire "lineup" for mathematics. Such interrogation seemed to be focused on the order or sequence of the mathematics courses, and not whether the district should even be engaging in tracking.

Unlike mathematics, other subjects did not have tracking at the middle school level. At the high school, tracking operated in the other subjects through slowed-down courses or courses that provide exposure to foundational concepts, similar to Algebra 1A (artifact: High School Career and Educational Planning Guide). These were called "skills" or "elemental" courses, primarily serving students with an individualized education plan. "Advanced" courses were offered starting in students' third and fourth years.

Mathematics was the target for increased tracking structures because it was core, sequential, and defined. As described earlier in the mathematics subject-matter context section, mathematics was core because it was heavily tested and mathematical skills were perceived as useful in other contexts. This allowed mathematics to have a special social status in RiverTown. Two RiverTown district leaders explicitly acknowledged this social status perceived by families and community members. For example, in explaining why the district received community resistance for previously not offering Algebra 1 in eighth grade, the superintendent shared:

> I don't know how long ago it's been, they [the middle school] did not offer it, an Algebra 1 class in eighth grade. And I received phone calls from parents about why there wasn't an Algebra 1 class offered in eighth grade. And I think maybe that was my first year. So, I'm like, I don't, I don't know. I really didn't know. I was just told this is what we were going to do. And I think parents are used to that model. It is seen as a, it is a status thing. You know, if your child is placed in algebra, then obviously they are a gifted, bright student. Yeah, I think it is a, it's a status piece for parents.

That parents "used to that model" were concerned when the district did not offer eighth grade algebra suggests that tracking was important to the community, because eighth grade Algebra functioned as a form of social status, where students placed in the accelerated mathematics track were perceived to be “gifted” and “bright.” This indicator of mathematical competence was only possible when there are “non-gifted” students placed in the lower track, where such exclusion of students constructs mathematics as a scarce, economically valuable resource (Pais, 2014; Straehler-Pohl & Pais, 2014).

One principal also acknowledged this exclusion of students in the interview excerpt below (interview 2, 221210):

Principal: It becomes very segregated, like very segregated, because those kids then travel in a pack together, right? Like, is that inclusive? Is it not inclusive or should [it] be for all? So it’s like an ongoing debate I’ve had in every school about, like, what that looks like. But really, for us, by the time they reach junior level, that’s really where we see those tracks diverge a lot. So, for example, dual credit courses, AP courses, that’s kind of like the fork in the road.

PN: So you kind of brought up that kind of segregation. Is that, to your knowledge, is that happening in mathematics?

Principal: I mean, it’s based on ability, right? So it’s not, it should never be based on gender, race, socioeconomic status. It is truly based on ability. Unfortunately, we know that students from different socioeconomic statuses and races sometimes score better in math. Right. So I would hate to say that, I don’t believe it’s inherently discriminatory, because it is equal performance level. But when you look at the population of our students, I think we definitely have to look at what are students who are of color and have low income, are they performing at the same rate as our other students.

Here, the principal acknowledged the exclusion and segregation that is inherent in tracking, and that tracking affords students access to qualitatively different learning opportunities (e.g., access to dual credit and AP courses). She, however, dismissed tracking as inequitable and “discriminatory,” because “it is truly based on ability” and “equal performance levels.” This focus on ability was rationalized by the reliance on standardized test scores, where seemingly “objective” quantification aligned with implicit assumptions that mathematical knowledge and competence is clearly defined and agreed upon. Such quantitative measures helped to maintain tracking, along with its disproportionalities between student groups.

As described earlier, discourses about mathematics as defined intersected with mathematics-as-sequential discourses, and they were dominant, reflected in individuals’ personal discourses and enacted through institutionalized routines and structures. In rationalizing the presence of tracking only in mathematics, four district leaders employed discourses about mathematics as defined, and five employed discourses about mathematics’ sequentiality. For example, the middle school principal explained that:

Principal: I feel like math is a block for some kids, right? So I don’t know if that’s why it’s separate.

PN: Wait, what do you mean by a block? What does that mean?

Principal: So I feel like there are building blocks a lot of times in science and math. So concepts kind of build on each other. So if you miss this concept, a lot of kids have a mental block. And then they feel like they're not good at math, and I can't do math, and they can't get that block knocked over to get to the next thing or, you know, it just becomes a hurdle for them…

PN: You had brought up that, you know, sometimes when there's additional honors courses, there's parent concern, or advocation for their children to be in those courses. Are you seeing that with the eighth-grade algebra?

Principal: No, because we have, there are tests, there are grades, we have placement tests. So the data shows that. And I feel like it's easier in math because it's more black and white than. I mean, in science, do you base it on a reading level (interview 2, 221214).

Here, the principal alluded to several unique aspects of school mathematics. The first is that it is sequential. There are "building blocks," but if students "miss" a concept, they are not able to succeed, in part, because they do not feel confident as a mathematics learner. Though the principal acknowledged identity-work as part of mathematical doing, this was dismissed by focusing on data sources like grades and standardized test scores, which reflected a limited conception of mathematical activity based on accuracy and getting the correct answer on tests. Such quantitative measures constructed mathematics as "black and white," which made visible whether a student was "good" at mathematics. Mathematical knowledge and competence were so clearly defined that even parents agreed that the "data shows" whether their student is "advanced" or not. In this conception of mathematical competence, only some students can be good at mathematics.

By comparison, in other subjects, it is less clear and defined about what it means to be and who is good in that subject.

Overall, tracking was an institutionalized structure continually reinforced by discourses about mathematics as sequential and well-defined. Intersecting with accountability discourses, they defined mathematical knowledge and activity, and made visible which students were "good" at mathematics. By contrast, other subjects were less sequential and defined, where it was less clear what being "good" in those subjects means. Moreover, there was a social status associated with mathematics, emanating from parents and the community. The interaction of these different discourses legitimized greater tracking in mathematics, as well as rationalized and maintained the social exclusion and segregation implicit in tracking.

Mechanism 3: Subject-Matter Context Maintained Non-Crossing of Policies into Mathematics

In RiverTown, most policies were subject-neutral. There were three potential reasons for this, and they were all likely operating in the district, mutually reinforcing one another. First, there seemed to be explicit intention from district leadership to build a sense of collectiveness among teachers and administration. This included creating buy-in from teachers (e.g., through including them in building leadership teams), as well as coherence, alignment, and communication among buildings. Manifesting in various forms, this was about creating a collective "we." For example, at the August 9, 2022 district administrative team retreat, the superintendent started the day with a motivational video on "unit strength"—the strength when multiple individuals collectively act as one unit—and that the district was "mov[ing] from I, the building, to we, the district." This "unit" was often through the metaphor of a ship, befitting the district's seafaring-themed mascot. For example, in reflecting on the retreats with the newly formed building leadership teams (BLTs), principals of both the 3-5 building and middle school noted that the BLTs provided teachers with decision-making power and "shared leadership" (observation: 220615 district administrative team). The middle school assistant principal added that teachers were "excited and willing to join our ship." The high school principal agreed, sharing that "people rarely tear things down they help build." In this series of exchanges, several district leaders noted the power of including and engaging others, especially teachers, in the same effort (i.e., building the same "ship").

This collectiveness was facilitated by subject-neutral efforts as there was a common policy that everyone was engaged in, regardless of content area, grade level, or building. For example, the district had been engaged in professional development related to the Artisan Themes of Teaching. This set of instructional practices was promoted as being applicable across all content areas, and therefore, had been taken up in a variety of capacities: by administration to provide instructional feedback to teachers (observation: 221019 district administration team meeting); in alignment with Network for Educator Effectiveness (NEE) standards for teacher evaluation (artifact: November, 2022 3-5 building report to the board); as a district "vision" for instruction (observation: 220809 district administrative retreat); as part of the Instructional Leadership Team to promote teacher uptake of these themes (observation: 220523 instructional leadership team planning meeting); and in monthly coaching newsletters to teachers. In a way, this set of instructional practices—listed on a physical handout—served as a boundary object that facilitated communication and coordination among individuals across the buildings (regardless of grade level, content area). For example, in planning for the Instructional Leadership Team (observation: 220523 ILT meeting), the district instructional coach and an elementary teacher leader looked together at the handout to determine the themes they would focus on in their coaching meetings with teachers. Then, this boundary object facilitated the work of district leaders and teachers (of all content areas) in the common practice of instructional improvement.

While this facilitated coherence across the district, such efforts also prevented attention to specific subjects. This is related to the second reason: the district leadership team was small, and included no specialized personnel. Because district leaders oversaw their individual building, or were responsible over all issues of curriculum and instruction—like the chief academic officer and district instructional coach—these individuals were not explicitly charged with thinking about and supporting issues of mathematics education, or any other content area. This meant that subjects were often treated equally, or issues of subject-matter were ignored. With the Artisan Themes of Teaching, district leaders looked for and provided feedback about the same instructional issues; there were no leaders tasked with attending to *mathematics* instruction specifically.

Third, policies and efforts at RiverTown tended to be subject-neutral because there was a “bright” boundary between instruction and other efforts that *indirectly* affect classroom teaching and learning. As a reminder, in Figure 4, this boundary is represented by the middle dashed circle labeled “Instruction (directly affects teaching/learning).” Policies related to supporting attendance, behavior, sense of belonging, and students’ well-being and mental health fell outside this boundary, as they only indirectly address issues of classroom instruction.

This bright boundary was, in part, maintained by the mathematics subject-matter context, which supported the non-crossing of subject-neutral policies. To illustrate the interaction between SMC and boundary framing, in the following section, I analyze efforts to support sense of belonging. After discussing the ways in which sense of belonging was framed as subject-neutral, I then reflect on how discourses about school mathematics reinforced the persistence of sense of belonging as subject-neutral.

Sense of belonging. Sense of belonging was a newer effort RiverTown was engaging in, initiated by the superintendent at the March, 15 2022 district administrative team meeting:

> One of the things we're going to be really focusing on and tying everything together is the importance of a sense of belonging....Belonging and instruction have to go together. That they're not separate entities. And that when we are in a public school system specifically, we have to connect the two together… Years before, it was very much instruction-minded. And now we're hearing a lot more conversation about social emotional learning. And now I think we're really tying the two together. That this is, this is what's been missing. We haven't connected the two together and that they really go together. Because if you don't have belonging, you don't have learning.

In the beginning of this quote, the superintendent *selected* and *named* two objects—sense of belonging and instruction. This act of selecting and naming foregrounded both objects as important to the district (note the use of "we"), but also established the two as different, since naming identifies things as "a *this* but not a *that*" (italics in original; van Hulst & Yanow, 2016, p. 99). However, the boundaries between learning/instruction and sense of belonging were quickly blurred: "belonging and instruction have to go together, they're not separate entities"; "connect the two together."

This connection, for the superintendent, seemed to be with respect to a cause-effect relation between belonging and learning: "because if you don't have belonging, you don't have learning." The structure of this sentence suggests that belonging was a necessary condition for learning, and learning was predicated on belonging. This framing was resonant with the high school principal as she then described a book she was currently reading about belonging and the "detrimental" health effects of loneliness. In her interview, the principal elaborated that "the research right now will say that students who feel a sense of belonging are more likely to have positive life outcomes in the short term and long term. So positive outcomes, higher rates of attendance, higher GPAs, higher academic achievement with belonging" (first interview, 220512). This served to frame sense of belonging as indirectly affecting academic achievement, even if it was separate from instruction.

This blurring continued as the superintendent moved the conversation towards developing district measures:

> We have to decide what's important to the [RiverTown] School District. Maybe it's MAP scores. Maybe it's EOC scores. But what are some other measures that signal what is important to us. And I think from conversations with all of you all over a number of years, some of you not quite as long, is that sense of belonging, maybe we haven't put it in those words at that time, is very powerful.

Again, the superintendent blurred the boundary by universalizing MAP/EOC scores (measures of learning and instruction) and belonging as things that matter to the district. Though this boundary blurring legitimized the district's pursual of belonging, it was not resonant with other leaders. For example, when invited to share their ideas for potential measures for the district, other leaders shared measures that were often not specific to instruction (e.g., positive behavior; teacher retention), and when they were, they were in subject-neutral terms (e.g., "engaging" lessons).

At the next month's (April 19, 2022) district administrative team meeting, leaders continued their conversation about district measures, and again, the boundary between sense of belonging and learning/instruction persisted, despite the superintendent's previous attempts at blurring the two. For example, the conversation began with engaging lessons, then moved to discussions of student, parent, and teacher sense of belonging. The superintendent then redirected the conversation by stating that "we don't have anything for academics, beside engagement." Here, she explicitly positioned engagement as falling within the boundaries of academics, and sense of belonging as falling outside. This framing served to maintain differences between sense of belonging and instruction/academics, and therefore sense of belonging falling outside the "instruction" boundary.

This boundary framing was resonant, as the administrative team (with leading by the superintendent) decided to measure three key areas: sense of belonging, engagement, and transitions between buildings. The rest of the meeting involved discussions regarding how to measure each of these three areas. Leaders' brainstorming for ways to measure belonging and engagement further revealed how the boundary between these two areas were maintained, rather than blurred. For example, measures for student sense of belonging included attendance, student involvement in extracurriculars, and student perception of whether there was a school adult that cares for them. These measures suggest that belonging was in reference to belonging within the school or district, and not necessarily belonging in the mathematics or science classroom (i.e., belonging is subject-neutral). By contrast, measures for engagement included teacher observations, views on the district coaching newsletter, and student surveys of teaching. There was no crossing between the two.

While sense of belonging was often framed as falling outside the “instruction” boundaries, there was blurring between sense of belonging and issues of student mental health. For example, during the 2022 spring semester, the district-wide student mental health committee (composed of administrators and counselors) initiated a survey that was personalized and distributed to each of the buildings. This survey asked questions pertaining to both mental health (e.g., questions about stressors) and sense of belonging (e.g., questions about attendance, extra-curricular involvement, relationships with peers and teachers). For example, at the technical education center, survey questions included “I feel like an outsider” and “adults like some students based on their status in the community” (according to director of technical education center, second interview, 221209). This suggests that sense of belonging was with respect to students’ hierarchy and place in the school and district, with no explicit attention to the (mathematics) classroom.

Sense of belonging was often framed in terms of involvement in the school and district, including in after-school clubs, athletics, and other extracurriculars. This framing was employed by several district leaders, in interviews and district leadership team meetings (e.g., 220419 meeting), as well as encoded in official policy texts (e.g., May 2022 high school report to the board). More generally, involvement was a way to support students feeling like they: “have a group that they belong to” (PK-2 building principal, second interview, 221207); “fit in at school” (director of technical education center, second interview, 221209); “have a purpose for being here” (district instructional coach, second interview, 221216); feel that “your activity [is] valued” (high school principal, second interview, 221210). In these examples, sense of belonging was understood to be about feeling included in a social group, because students feel valued and that they are contributing members.

There was no explicit attention to thinking about what sense of belonging would look like in the mathematics classroom; in other words, sense of belonging fell outside the boundary of mathematics education policy (and the “instruction” boundary more broadly). There were two reasons the mathematics SMC maintained this non-crossing: 1) there was a lack of mathematics-specific discourses to support a mathematics-specific form; and 2) available mathematics-specific discourses were incompatible with a potential mathematics-specific form.

Reason 1. First, the mathematics SMC at RiverTown was not characterized by discourses that would support a mathematics-specific form of sense of belonging (i.e., sense of belonging within the boundary of mathematics). This first requires understanding what sense of belonging in mathematics might look like. As described earlier, in RiverTown, sense of belonging was about feeling like a valued and contributing member of a social group. So, in mathematics, this might include students feeling like they are a member of the mathematics community, because they feel mathematically competent, their mathematical contributions are valued, and that mathematics is important to their lives. As such, mathematical learning and doing is inextricably linked to identity, including mathematical identities as well as gender, racial, class, and other identities. Then, underlying this potential mathematics-specific form of sense of belonging are discourses about mathematical activity as identity work, and that mathematics teaching should support students to feel mathematically competent. This also suggests that equity in mathematics extends beyond just issues of access and achievement and into students' identities, in the mathematics classroom and beyond the institution of schooling.

As described earlier, not only were identity-related equity issues controversial in RiverTown, but equity in mathematics was primarily understood in relation to access and meeting students' needs, and not issues of identity. Moreover, discourses related to mathematics pedagogy were fairly absent, and primarily only with respect to the importance of multiple strategies. As such, mathematics teaching was not explicitly about providing learning opportunities that affirm students' mathematical identities. This suggests that, at RiverTown, the mathematics SMC was compatible with the framing of sense of belonging as outside the boundary of mathematics education. So, since there was a lack of mathematics-specific discourses to support a mathematics-specific form, sense of belonging stayed subject-neutral and did not cross into the boundary of mathematics education policy.

Reason 2. Not only were there no mathematics-specific discourses that made sense of belonging relevant to the mathematics classroom (i.e., help sense of belonging cross), but available mathematics-specific discourses explicitly countered belonging in mathematics. First, mathematical activity, through accountability discourses, was narrowly defined to performance on high-stakes tests. This constructed exclusionary understandings of mathematical competence, where only some students can be good at mathematics. And, this hierarchy of students and their mathematical competence was undergirded by the sequentiality of mathematics, which was institutionalized throughout RiverTown via tracking, as well as intervention and data-based decision making practices. All of these mathematics-specific discourses worked together to construct sense of belonging in mathematics—where students feel mathematically competent, and their mathematical contributions are valued—as untenable.

Second, issues of identity were seen as irrelevant to mathematics, which countered a mathematics-specific form of sense of belonging where mathematical activity would be understood as identity work. This manifested implicitly, as well as explicitly. For example, “critical race theory” and identity-related issues were seen as controversial, so RiverTown district leaders and teachers avoided discussions of such topics. This was discussed at the October 19, 2022 district administrative team meeting, where the superintendent shared reminders from legal counsel about increases in community politics and legislation regarding “racially insensitive language.” The superintendent shared that novels like *Of Mice and Men* included such language, and that this raised questions about “how are we handling diversity and inclusion, yet balancing ‘I need to be able to be historically accurate’ or ‘make sure I’m giving the cultural context, specific information in ELA.’” The high school principal added that her ELA team met prior to the beginning of the school year to discuss providing information to families about the content of novels and allowing students to opt-out. Here, by focusing on novels and historical accuracy, discussions about such racial and equity issues were seen as relevant to ELA and social studies, and not necessarily mathematics.

Similarly, the chief academic officer (CAO) explained that "critical race theory" was mostly relevant to only social studies. In the below exchange (interview 2, 221213), she discussed that they were avoiding CRT in their new curricular adoption for social studies:

> CAO: The legislators really said that that's [CRT] not appropriate for school districts. And so I think, especially in social studies, that seems to be where it kind of comes up the most, and just educating our staff on what that means.
>
> PN: That makes sense. Do you see kind of those critical issues coming up at all in the other school subjects?
>
> CAO: Mostly social studies.

This, along with the exchange at the October district administrative team meeting, provides evidence that the framing of identity-related equity issues as falling outside the boundary of mathematics was resonant among several RiverTown district leaders.

The 3-5 building assistant principal helped to explain why these issues were relevant in social studies but not mathematics. She shared that the district was trying to find social studies curriculum "that would be relevant to a rural district, as opposed to an urban district, because they're made different," though such issues were not applicable to mathematics because "math's math. I mean, you're not really, unless you're doing word problems. Division is division. It doesn't really have an urban or rural context" (interview, 221110). Though she acknowledged that context matters with respect to “word problems,” this was the exception to the generality that mathematics is mostly unrelated to students’ experiences and identities in the places they live. Mathematics is context-free because mathematics is well-defined; “division is division” suggests that it is agreed upon what counts as mathematics and mathematical doing. As shown earlier, these discourses about mathematics as well-defined were ingrained across the district, through individuals’ personal discourses as well as enacted in institutionalized routines and structures. In the above quote, these discourses about mathematics rendered identity as irrelevant to mathematics. Because these were incompatible, sense of belonging in mathematics—where mathematical learning and doing is inextricably linked to students’ (mathematical) identities—was made nonsensical and out of the imagination.

In short, at RiverTown, sense of belonging was about feeling like a valued and contributing member of the school or district, and not necessarily in the (mathematics) classroom. Policy discussions about sense of belonging often positioned belonging as different and separate from teaching and learning, so sense of belonging fell outside the “instruction” boundary, and therefore also outside the boundaries of mathematics education policy. The mathematics SMC supported and maintained the durability of this subject-neutral policy through two reasons. First, there were no mathematics-specific discourses that supported sense of belonging in crossing the mathematics boundary: absent were pedagogy-related discourses that viewed teaching as providing learning opportunities that affirm students’ mathematical identities, which would support students to feel like members of the classroom community. Second, there were mathematics-specific discourses that explicitly countered belonging in mathematics. Mathematical activity and competence were defined by accountability and mathematics–as–sequential discourses, which provided narrow opportunities for students to feel like their contributions were valued in the mathematics classroom. Moreover, because mathematics was seen as well-defined and irrelevant to identity, it was nonsensical for sense of belonging to take a mathematics-specific form. These mechanisms functioned together to prevent the crossing of sense of belonging into mathematics, and maintain the boundary between the two.

Summary

At RiverTown, the mathematics SMC shaped boundary framing through three mechanisms. First, the SMC made available dominant accountability discourses and discourses about student needs that constructed the problem—"gaps" and "needs"—and its subject location—mathematics and ELA, because they are the most core. Sometimes mathematics-as- defined and sequential discourses were influential and legitimized mathematics as the target for achievement-addressing solutions (as was the case with intervention), but discourses about mathematics pedagogy were fairly absent and not powerful. As a second mechanism, the SMC supported the crossing of subject-neutral policies into the mathematics boundary. For example, tracking operated the most in mathematics, because it had a special social status, and discourses about mathematics as defined and sequential made visible which students were "good" at mathematics. Other subject-neutral policies never crossed into mathematics, which was in part maintained by the SMC—a third mechanism. With the example of sense of belonging, the SMC did not make available discourses that would support sense of belonging crossing into mathematics, as there were no pedagogy-related discourses about supporting students' positive mathematics identities. Moreover, there were dominant discourses about accountability and mathematics as defined and sequential that constructed exclusionary understandings of mathematical competence and explicitly framed mathematical activity as irrelevant to students' identity, which countered a mathematics-specific understanding of sense of belonging.

CHAPTER 5: ROCKCITY SCHOOL DISTRICT

Compared to small, rural RiverTown, RockCity was a much larger school district, situated in a more racially diverse micropolitan area. Given the large and hierarchical organizational structure of the central office, district policymaking (for mathematics) was separated between cabinet members and middle-level leaders. At the cabinet level, the boundaries of mathematics education policy were narrowly constrained to achievement concerns, reinforced by discourses about accountability, mathematics as core, and, to a lesser extent, mathematics as sequential. In enacting policies handed down from the cabinet, and in pursuing their own policymaking, middle-level leaders negotiated dominant social discourses from the cabinet, other departments, and institutionalized policies and structures with their own personal discourses related to mathematics pedagogy and equity. Unlike RiverTown, equity in mathematics was activity pursued in RockCity, though it was focused on issues of access and achievement gaps, in part constrained by discourses about accountability and mathematics as sequential. So, the boundaries for mathematics education policy in RockCity were also narrowly constrained to achievement concerns.

In what follows, I characterize the mathematics subject-matter context (SMC) by its dominant discourses, and describe how the SMC shaped the boundaries of mathematics education policy. Before that, I first provide some background on RockCity's local context, as well as the district's organizational structure and policy history.

RockCity's Local Context, Organizational Structure, and History

RockCity's Local Context and Demographics

RockCity School District was located in a large, micropolitan community home to three colleges and universities. As the county seat, its population was over 125,000 residents. For 2017-2021, the median household income for RockCity families was above $57,000, with the per capita income slightly below $33,000, slightly below the state averages at $61,043 and $33,770, respectively (US Census Bureau, 2021). Compared to RiverTown, the RockCity local community was characterized by a stronger economy, with education as its largest industry. Politically, especially compared to RiverTown, RockCity tended to be more progressive.

In 2020, approximately 73% of the local population was white, with almost 12% identifying as Black, 6% identifying as Asian, 6% identifying as multiracial, and 3% identifying as Hispanic. The RockCity student population in 2022 was diverse: 57% white, 21% Black, 10% multiracial, 7% Hispanic, 5% Asian. 44% of students qualified for free or reduced price lunch, which had increased from 33% in 2008. As indicated in Table 1, during that same time period, the student population increased to almost 18,000, with increasing racial and ethnic diversity. As one of the largest school districts in Missouri, RockCity included 21 elementary schools, seven middle schools, four high schools, a career center that served the county, and an early childhood program.

RockCity's Organizational Structure

Organized in a traditional hierarchy, a seven-member board governed the superintendent, who oversaw the cabinet. The cabinet included two assistant superintendents—one for elementary education, the other for secondary—as well as chief officers for equity, communications, operations, human resources, and finance. In recent years, RockCity had experienced some leadership turnover. The current superintendent joined RockCity for the 2021-2022 academic year. Both of the assistant superintendents were also new to their roles that year, though had previously worked in RockCity in various capacities.

Cabinet members oversaw various departments and specialized offices responsible for different aspects of schooling. Most relevant to this study were the following departments:

- Assessment, intervention, and data (AID) department oversaw "data-based decision-making for our schools and community" (RockCity website)
- Curriculum and instruction (C&I) department managed instructional and curricular issues, and housed coordinators for various subject areas, including two coordinators (elementary and secondary) for mathematics, ELA, and science each, and one coordinator each for social studies, art, physical education and health, world languages, library media, online instruction, etc. The C&I department was run by the C&I director, who managed the various content coordinators.
- Equity department housed several other programs and divisions, including: bullying; English learners and migrant services; homeschool communicators; homeless services; registrar; student support services; and Title IX.

In addition to the various departments and programs at central office, the cabinet also supervised the building principals. Monthly, each assistant superintendent held a day-long meeting with their respective building principals and discussed district-wide policies and issues.

Given the hierarchical structure of the RockCity central office, decision-making tended to be top-down. Several district leaders expressed that the superintendent and cabinet ultimately made decisions. That cabinet made decisions for the district with little involvement from others was a common frustration participants shared, in both interviews and during observations (observations: 220914 secondary principals meeting; 221104 Better Conversations professional development). This sentiment came from coordinators, directors in charge of various departments, as well as building principals. Principals had authority over their respective buildings, so the district was decentralized in this respect, but there were still several district-wide mandates, such as equity trainings, standards-referenced grading, and assessment and intervention, that were handed down to principals to enact in their individual building.

The mathematics coordinators were several rungs removed from the cabinet, so they were oftentimes left out of policy discussions. For example, there were weekly cabinet meetings that also included the directors of AID, C&I, and school improvement and federal programs. Conversations often revolved around mathematics, though the mathematics coordinators were just recently invited to these meetings towards the end of my data collection in December 2022. One of the mathematics coordinators also shared that:

> I can't tell you the number of times that I say 'why wasn't I in that room, like I wish I had been in that room.' Like the assessment work that we did [assessments developed by the coordinator and her team], they're having these decisions about whether we're going to cut this or do this, nobody asked me or talked to me about it (interview 1, 220412).

For the coordinator, she was not invited to decision-making conversations about efforts she spearheaded and managed—assessments for mathematics—nor district-wide policies, like the adoption of a new assessment system for mathematics and reading.

Because RockCity's central office was departmentalized, there was specialization and attention to specific content areas and issues of schooling (e.g., equity; assessment). This, however, also siloed individuals and workflow, and was a barrier to communication and collaboration. For example, principals and C&I coordinators had separate meetings, with communication primarily going through the assistant superintendents or the director of C&I. Coordinators oftentimes expressed frustrations about this lack of communication (observations: 220726 C&I retreat; 220912 C&I meeting). To address this, C&I representatives started joining the monthly principals meetings in the fall of 2022 and there was professional development to foster better communication among principals, C&I coordinators, and instructional coaches. As another example, during a meeting to discuss standards-referenced grading policies, principals and C&I coordinators expressed concern about how they were making decisions regarding grading, but that the AID department would be facilitating training to teachers about using the grading system (observation: 220531 secondary SRG meeting).

Teachers were not very involved in district-level decision-making. Though there were various committees and advisory groups that included teachers, they were only provided opportunities to provide feedback, with little power or authority to make decisions. For example, in the spring of 2022, in adopting a new assessment system for mathematics and ELA, teachers were provided a 1.5 hour informational session about the different systems available to adopt and asked to provide feedback through an electronic survey. Similarly, teachers felt that they were not involved in the drafting of the district's new behavior education plan. In gathering feedback for the new 2022-2027 continuous improvement plan, the district solicited a Thought Exchange—an open-ended survey where participants rate others' responses—with staff and community members, and one of the top-rated comments was that the "development of the behavior education plan matrix should have included teachers."

Accountability, Mathematics, and Equity Efforts at RockCity

On state standardized tests in mathematics and English language arts, for 2018-2019, RockCity performed at or slightly above the state average—overall and for their white and Asian students—but below the state average for their Black, Hispanic, multiracial students and students qualifying for free and reduced price lunch (FRL). There was no state testing in 2020. In 2021, RockCity performed below the state average overall and for all students groups, except Asian students in mathematics and white and Asian students in ELA.

In the early 2000s, RockCity adopted National Science Foundation reform-oriented curriculum materials for K-12, including *Investigations in Numbers, Data and Space* in the elementary grades and integrated curricular materials in the secondary grades. Years later, in 2008, when the district was revising their K-8 curriculum standards as part of their 6-year cycle, parents and the local community signed a petition asking RockCity to revert back to more traditional mathematics curriculum. In response to the petition and backlash, RockCity created a committee to comment on the mathematics curriculum, including district leaders, university professors, parents, teachers, and business leaders. The board voted to adopt the new curriculum standards the committee drafted, standards that included additional emphasis on procedural fluency and the addition of the term “standard algorithm.” Moreover, *Investigations* was replaced with *enVisionMATH*, which was perceived to address both a traditional emphasis on procedures, as well as conceptual understanding. Though RockCity’s “math wars” was over a decade ago, it was still fresh in some district leaders’ minds, as individuals raised these issues in interviews, as well as in observations (e.g., 220808 mathematics department retreat).

RockCity’s equity department was created in 2017, but equity efforts had long predated this. In 2003, the Achievement Gap Task Force was created with the goal of eliminating the achievement gap. While this lofty goal is still being addressed, this task force resulted in, for the 2012-2013 school year, the development of and policies for equity and restorative practices professional development. This began first with district leaders, administrators, and coordinators, as well as new RockCity teachers, and has since expanded to include all staff. In 2019, the chief equity officer formed a working group to establish an equity statement, which was formally adopted by the board in 2020.

RockCity’s Mathematics Subject-Matter Context

In RockCity, the mathematics SMC was saturated with discourses about mathematics as core. Reinforced and made explicit by accountability discourses, mathematics-as-core discourses were very visible, stated in official district policy texts, acknowledged by participants, and reflected in the prioritization of mathematics in resources. More implicit were discourses about mathematics as defined and sequential, which were hidden and institutionalized behind intervention and tracking structures, and reinforced by accountability policies. While discourses about mathematics as core, sequential, and defined were fairly agreed upon across the district, discourses related to mathematics pedagogy were much more contested. The mathematics coordinators' personal discourses reflecting inquiry-based mathematics instruction competed with discourses promoting more traditional forms of direct instruction, which emanated from the AID department and their interventions, as well as parents and community members. Equity discourses were occasionally challenged, though they were institutionalized in official policy texts and district-wide efforts. These discourses were enacted through solutions that supported staff's learning about issues of identity, privilege, and oppression, to address problems in access and achievement. Interdiscursivity with accountability discourses constructed equity challenges as disparities and gaps between student groups, specifically in mathematics and ELA. In the following, I discuss how these discourses interacted to construct the mathematics SMC at RockCity.

Explicit and Visible Discourses about Mathematics as Core

At RockCity, mathematics and ELA were the most core school subjects. Discourses about mathematics and ELA as core were explicitly reported by all interviewed district leaders, written in policy texts, and reflected in the greater allocation of resources and instructional time. For example, mathematics and ELA were the primary targets of intervention (artifacts: assessment plan for 2022-2023), tutoring (observation: 221116 secondary principals meeting), and instructional coaching (observation: 220909 instructional mentors and coaches meeting), and also were allotted more instructional time in the elementary school schedule (artifact: elementary sample schedules).

As discussed in the RiverTown case, mathematics was a core school subject for two primary reasons: 1) mathematics is heavily tested; and 2) mathematical knowledge is useful and can be transferred to other contexts. Regarding the former, the pressure from state accountability policies on mathematics (and ELA) was most exemplified through the district's continuous school improvement plans (CSIP). In both the 2018-2022 and 2022-2027 plans, mathematics and ELA (communication arts) were the only subjects named, specifically in reference to standardized tests and the need to "catch them [students] up" so they have "readiness in literacy and math" (2018-2022 CSIP). Similarly, on the 2022-2027 CSIP, the third and final goal was that "the percent of [students] who are proficient on the MAP [Missouri Assessment Program] will increase by 3% each year in communication arts and mathematics." All interviewed district leaders acknowledged this accountability emphasis, from state and federal policies, but also from the public. As the elementary mathematics coordinator explained, "in the United States, we're looking at reading and math data more than anything else" (interview 1, 220412).

Besides being heavily tested, mathematics was also core because mathematical knowledge is perceived to be useful and applicable. Like at RiverTown, mathematics was considered important for science learning and doing. For example, the director of the assessment, invention, and data (AID) department shared that "in science, you do have the math that relates to that and how you interpret data and things like that" (interview 1, 220505). More broadly, mathematics was important for teaching students reasoning and logical thinking skills. For example, the chief equity officer explained that:

> Those are also the two areas that I think that, not just for math and language arts curriculum, but those two really teach our students how to think about thinking. Those are transferable skills. So post high school, into secondary, post-secondary

> education, just life skills, teaching people how to receive information and how to think through it and function. You may not necessarily use geometry on a daily basis, but thinking about the thinking is what we want our kids to be able to do (interview 2, 221216).

Here, mathematics' importance was derived from its ability to develop "mental discipline" (Stanic, 1987), where it is expected that through learning mathematics, students learn important skills that are transferrable to post-secondary education and, even, life. Overall, seven of eight interviewed district leaders described this "utility" of mathematical knowledge.

Overall, discourses about mathematics as core were hegemonic at RockCity, as they emanated from several sources: individuals' personal discourses, state and national accountability policies, official district policy texts, and distribution of resources. This contributed to creating a subject-matter context where mathematics was one of the prioritized subjects in the district. Like at RiverTown, ELA was also core, so RockCity district leaders had to negotiate the competing discourses of mathematics as core, and ELA as core. For example, in negotiating the elementary schedule, the elementary content coordinators (mathematics, ELA, science, and social studies) all fought for additional instructional time (observation 220503 elementary coordinators meeting). Because reading was prioritized and needed the most minutes, the science and social studies coordinators, and to some extent the mathematics coordinator, oftentimes compromised and gave up some of their instructional time.

Ingrained Discourses about Mathematics as Sequential and Well-Defined

At RockCity, mathematics was understood to be inherently sequential and well-defined. Similar to RiverTown, these discourses were implicit (i.e., not explicitly written in policy texts), expressed through individuals' personal discourses and enacted in school structures like intervention and tracking.

Seven interviewed district leaders expressed discourses about mathematics as sequential, and six expressed discourses about mathematics as defined. For example, the assistant superintendent of secondary education explained that:

> math is, it's right or wrong. And you've got to think, you've got to explain your thinking and you've got to be able to have a conversation and communicate about the thinking and the reasoning behind your choices when you complete a problem. But I think it's a bit more clearly defined about you can do this, you can't do this. Or you can do this and be successful and feel successful, or this is more of a struggle for you. So I think like the stair steps for math, and I'm not a math teacher, so maybe I'm totally wrong. I just think the stair steps for math are a little bit clearer (interview 2, 221209).

Here, the assistant superintendent intertwined ideas about mathematics as sequential with ideas about mathematics as defined. Because mathematics is about "right or wrong," it is visible and agreed upon how the "stair steps for math" progress, and therefore who is mathematically competent. Though she alluded to mathematical activity as more than accuracy, to include reasoning and mathematical communication, the well-defined nature of mathematics perpetuated an exclusionary understanding of mathematical competence where only some people "can be successful," while others "struggle."

Beyond individuals' personal discourses, mathematics-as-sequential and well-defined were enacted through institutionalized routines and structures, like intervention and tracking. Regarding the former, teachers used *i-Ready* [an assessment platform the district purchased that includes diagnostic assessments intended to predict results on the state test] to "monitor progress" of all students in grades 3-8 in reading and mathematics every six weeks (artifact: assessment plan for 2022-2023 academic year). The *i-Ready* system grouped students into three levels—"below level," "on level" and "above level"—which "mimics the state proficiency levels." Students who were "not on track to be proficient on the MAP [Missouri Assessment Program] by the end of the school year" (artifact: assessment plan) were then assigned to intervention. Implicit in these intervention and data practices was a hierarchy of students and their mathematical competence. This hierarchy, and the grouping of students based on whether they are "on level," was predicated on standardized tests (both state and *i-Ready*) that (narrowly) defined what mathematical knowledge is, and who has it.

i-Ready data were not only used to monitor student progress and inform intervention (groupings), but also which students gained admission into advanced mathematics courses. The director of AID explained that:

> The criteria for advanced math is pretty generous. Basically it's, if you're at least the 40th percentile in math, then you can get into the advanced math classes. And that came about through the data. We actually checked to see, you know, kind of what score threshold on our local assessments means that they're going to be successful in taking the end of course exams through the state, and 40th percentile was it (interview 2, 2201208).

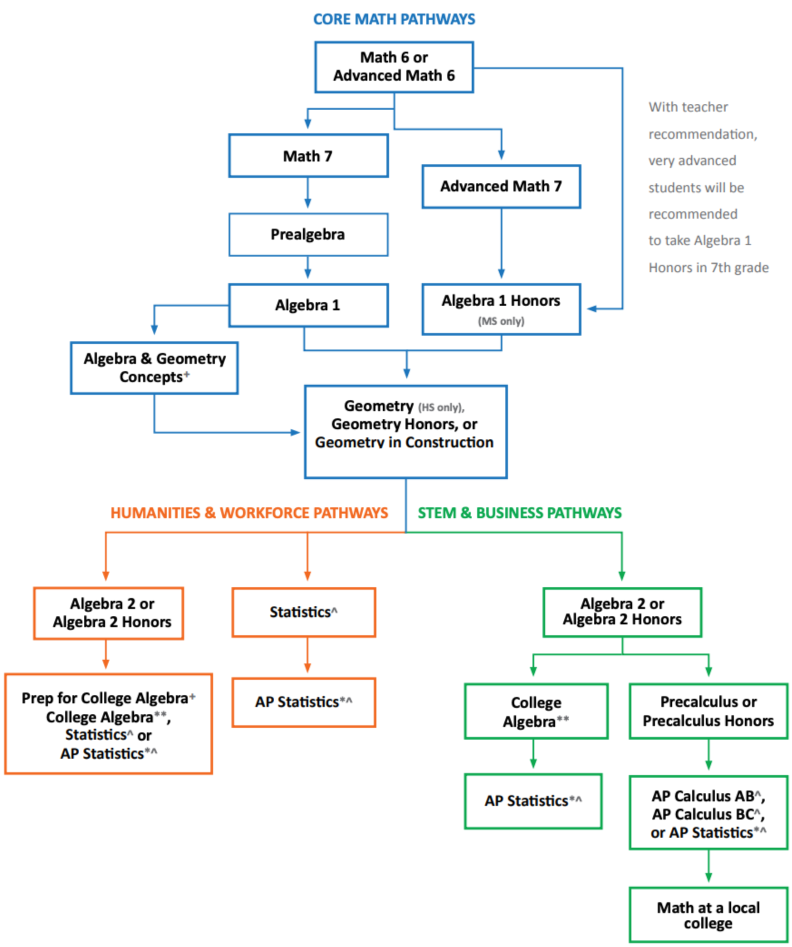
Again, what was defined as mathematically "successful," and whether a student was considered "advanced," was performance on the state standardized test, as well as the local *i-Ready* assessment. This suggests that tracking decisions were shaped by the interaction of accountability discourses and discourses about mathematics about sequential and defined.

In RockCity, mathematics was the subject with the most tracking at the middle school level, starting as early as 6th grade (see Figure 6 for mathematics tracks at RockCity, from 2023-2024 high school course catalog). For at least the past decade, mathematics was the only content area to have advanced courses in the middle schools, until the creation of an integrated English and social studies advanced eighth grade course during the 2021-2022 academic year (artifact: proposal for advanced core content middle school options). This also spurred advanced courses in middle school science, as well as additional accelerated opportunities in mathematics. This will be further discussed in Chapter 5, but for understanding the mathematics subject-matter context, this increased tracking suggests that discourses about mathematics as sequential and well-defined were institutionalized and continued to be reproduced.

Though these social discourses were ingrained across RockCity, they were not uncontested. For example, during the October 7, 2022 elementary instructional coach and mentors meeting, the elementary mathematics coordinator explained that RockCity's standardized testing data shows that algebra 1 is where "scores go down," and that "our fifth grade scores might be great, but we're not setting them up for success." She elaborated that "students need flexibility, not just memorizing one procedure." Here, by highlighting the discrepancy between "great" fifth grade scores and low eighth grade scores, the elementary mathematics coordinator challenged the idea that mathematics is sequential, since fifth grade performance should be “setting them [students] up for success” in future grades. And, by drawing upon ideas about mathematical understanding as flexibility and not just memorization of procedures, she also challenged mathematical competence as defined by standardized test scores. She raised a similar point during a meeting with the assistant superintendent of elementary education and the director of curriculum and instruction (observation: 221212 elementary mathematics curriculum meeting).

Figure 6

2022-2023 Mathematics Tracks at RockCity School District (edited)



The secondary mathematics coordinator similarly espoused discourses that challenged ideas about mathematics as sequential and well-defined. While her dream was to "de-track sixth grade" (interview 1, 220414), she explained that "it's a big battle" to not offer honors in RockCity, but they might be able to "push it off until eight grade" (observation: 221011 middle school mathematics department chair meeting). The mathematics department chairs (one chair at each secondary building) similarly agreed that they wanted to de-track, though expressed concerns about the feasibility, especially given that there were district leaders and efforts to increase honors courses in other subjects.

Overall, at RockCity, discourses about mathematics as sequential and defined were expressed by a majority of interviewed district leaders and hidden behind district-wide routines and structures. Together, these discourses perpetuated narrow views of mathematical activity and competence. Though discourses about mathematics as defined and sequential were widespread, permeating school structures, teachers' practice, and students' experiences, they were occasionally contested. This was, however, only through the personal discourses of mathematics-specific district and school-leaders. So, these personal discourses were very much overpowered by dominant and institutionalized discourses about mathematics as sequential and (narrowly) defined.

Contested Discourses Related to Mathematics Pedagogy

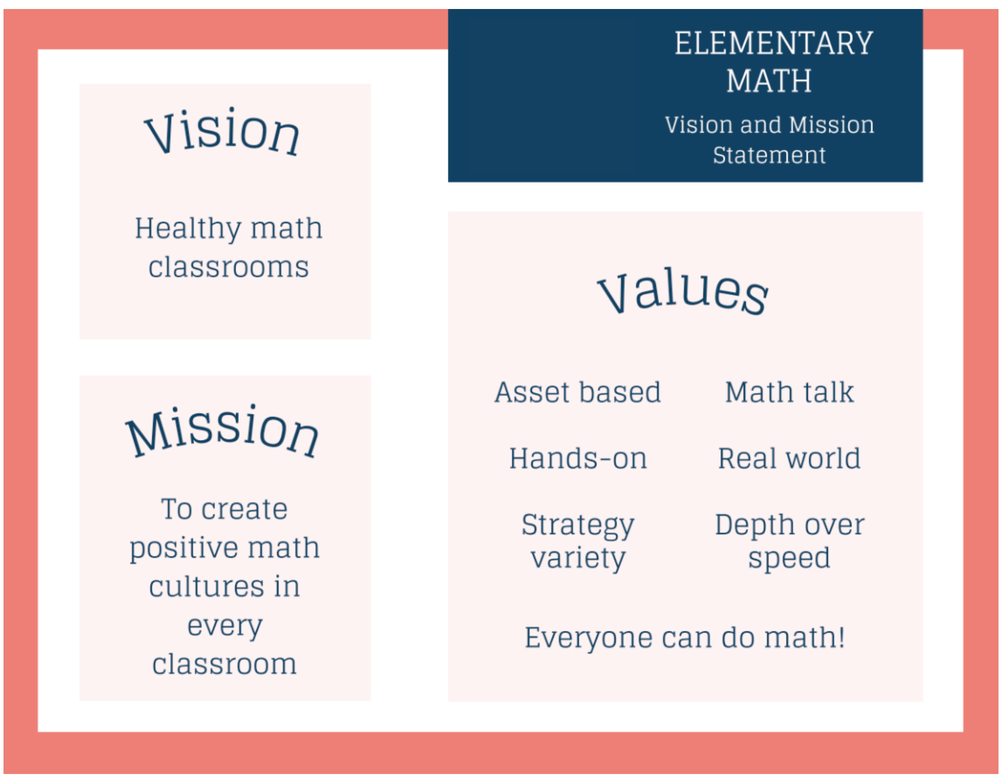
Discourses related to mathematics pedagogy were differently employed by different people, across different spaces. Among those that were not explicitly charged with supporting mathematics education, issues of mathematics pedagogy were infrequently discussed. By contrast, discourses about mathematics pedagogy were prevalent among district leaders that directly oversaw issues of mathematics instruction (e.g., mathematics coordinators; mathematics department chairs; instructional coaches and mentors). This was evidenced through my interviews: I coded, on average, nine references per interview with the mathematics coordinators, but less than 1.5 references per interview with other district leaders.

Similarly, I coded discourses related to mathematics pedagogy primarily during observations led by one of the mathematics coordinators (e.g., mathematics department chair meetings, meetings with instructional coaches and mentors), and rarely during other observations, like principals' meetings or board meetings. There were a couple exceptions, though these exceptions were from the mathematics coordinators. For example, during the September 15, 2022 elementary principals' meeting, the elementary mathematics and ELA coordinators, along with the coordinator of assessment and intervention, presented on how principals could use data and resources from the Missouri Assessment Program [MAP] to support improvements in Tier One instruction (whole-class instruction for all students). This presentation focused on understanding and analyzing data, and ended with recommendations for supporting growth in achievement. The mathematics coordinator provided strategies that included focusing on "conceptual understanding of operations" and "having teachers use manipulatives and drawings to represent problems," as well as "routines that foster discussion" like Number Sense Routines, Three Read Protocol, and Three Act Tasks (artifact: strategies to support K-5 math MAP growth).

Through the interviews and the meetings they led, the mathematics coordinators often employed discourses that aligned more with inquiry-based mathematics instruction than with traditional approaches, including a focus on conceptual understanding and sensemaking, the use of cognitively demanding tasks, discourse in mathematics, heterogenous grouping, joy in mathematics, and positive mathematical identities. This was broadly reflected in the elementary mathematics vision and mission statement (see Figure 7) that was developed by the elementary mathematics coordinator and her team of mathematics instructional mentors (observation: 220418 instructional mentor work session).

Figure 7

Elementary Math Vision And Mission Statement (edited to protect confidentiality)



It is important to note here that the pedagogy-related discourses promoted by the mathematics coordinators and their teams allow for more inclusive frames of mathematical activity and competence (Louie, 2017), where mathematical doing is not just rote practice, but also about making sense of important mathematical ideas through collaboration, discourse, and experimentation (Hiebert & Grouws, 2007; Stein et al., 2008). This allows for teachers to take an asset-based perspective and view many more students as mathematically competent, since skills not traditionally seen as mathematical are now valued.

Though these discourses were promoted by the mathematics coordinators, they were not necessarily dominant across the district, in part, because people were unaware of their presence. In the interview exchange below, one of the mathematics coordinators (MC) discussed that while she would like her instructional vision "to steer the ship" for mathematics-related decisions, that's not likely happening:

> PN: Do you think the district is using that to make decisions about math?
>
> MC: I don't know. Well, no, because they don't even know it exists [laughs]. I mean, they might, they might, but not, no. I mean, if I'm in the room when those decisions are being made, then yeah, right. That's the voice that I bring. But no, I don't think so (interview 2, 221201).

According to the mathematics coordinator, other district leaders "don't even know it exists," so it is unlikely that these discourses about mathematics pedagogy were influential in shaping policies and efforts in RockCity, unless she was "in the room when those decisions are being made." Despite this, the mathematics coordinators worked to promote these discourses through professional development, their work with instructional coaches and mentors, and resources they shared with teachers and principals, including through the monthly newsletters they send out (artifacts: 2022 secondary mathematics newsletters; 2022 elementary curriculum newsletters).

Moreover, the secondary mathematics coordinator felt that the recently adopted curricular materials in the middle school (*Ready*), as well as the materials she was working to adopt for the high schools (*Illustrative Math*), aligned with and promoted this vision. She explained that the *Ready* curriculum:

> starts with a problem where they want, you know, the idea is to like, these three strategies, you have some strategies, have kids talk about it. Come up with some ways, what are some thoughts of how they would solve it before the teacher jumps in. You know and then having the teacher facilitate, let's look at what all these students did and then kind of brings them together to look at some more strategies...Is it truly problem-based like the *Illustrative*? No. But I felt like it was a good compromise, because it like has the problem, but then it has some examples that the teachers can work through with kids that I just felt like that would make the most people happy and still be doing good things for our kids (interview 1, 220411).

Here, the mathematics coordinator described that the *Ready* curriculum employs an instructional approach where students try a problem on their own, and the teacher facilitates a mathematical conversation around the different student strategies used to solve that problem. For her, this curriculum still focuses on sensemaking and mathematical discourse, even if it was not as “problem-based” as the curriculum she was working to adopt in the high schools. This was a “compromise” between her personal discourses and others’ desire for practice “examples that the teachers can work through with kids.” This suggests that others, teachers in particular, have competing discourses related to mathematics pedagogy that mathematics coordinators need to negotiate with, and that these discourses were prevalent and contributed to constructing the mathematics SMC.

Indeed, there were competing discourses related to pedagogy across the curriculum and instruction department and the assessment, intervention, and data (AID) department. The director of AID explained that:

> One of the problems that you'll see in intervention is that the research behind intervention really is strongly on the side of explicit instruction. That's not always the philosophy that you see with typical general ed instruction. It's much more constructivist in nature and I don't necessarily have a problem with that… one of the things I have heard from the math department is that they are way more interested in seeing how a student solves a math problem than on whether they got the right answer. And I'm not saying I don't care about how they solved it because I absolutely do. How they solve it and what their thinking process is critically important to instruction. I completely agree with that philosophy. But when it is done without looking at whether they actually got the right, got to the right answer. I mean it's like hiring an accountant who knows how to do your taxes but gets it wrong in the end. I don't, I'm not really interested in that, you know, I need to know that that the student can get to right answer (interview 1, 220505)

Here, the director of AID explicitly acknowledged a philosophical divide between the two departments, stemming from the different perspectives they have about high-quality instruction. On the one hand, the AID department promoted explicit instruction and a focus on correct answers, and enacted such discourses through the mathematics (and reading) interventions they institutionalized throughout the district. On the other hand, the mathematics coordinators and their team took a "constructivist" approach to teaching and learning, and attended more to students' thinking and strategies than correct answers. Four other district leaders also alluded to the two department's competing discourses.

Not only were there different perspectives on high-quality teaching within the district, four district leaders also explained that there were social discourses emanating from parents and community members. The director of school improvement and federal programs, who was a previous mathematics teacher and had worked in the district (on and off) for over a decade, explained that:

> Years ago, we had math wars that really tore us apart, fifteen-ish years ago. But the reason why I say that is there's really that debate over making sense of your numbers versus just I was taught this way, and that's the way it should be. And this is how you should do your, division should be done this way and just, what I call the traditional way of doing math. And in that it's really kind of set us back, because there still are a lot of camps here, or a lot of feeling, I think, in [RockCity] of the 'new math' and 'stop with the new math' and all of that. And we all know that kids making sense of mathematics and you know, being able to explain it, and it may not be the traditional way of get out the bracket and do the division. It's just those pieces. So I think one of the things we struggle with in math is, one, buy-in from families when you don't do it the absolute traditional way. And I think we also though struggle with development for our teachers, and especially elementary teachers. There's a proportion of them that would say "math's really not my thing" and really understanding and trying to really teach

> teachers that everybody can do math. That they can teach the math, that they can understand the math behind it (interview 1, 220906).

For this district leader, there were still residual effects from the math wars that plagued the RockCity district and community in the late 2000s. There was still an ongoing debate between "new math" and "the traditional way" among parents and community members, as well as teachers. For teachers, not only were these "new" pedagogical approaches different than what they had previously experienced, but they countered their personal discourses about who can do mathematics (including themselves).

In short, in RockCity policymaking and leadership, discourses about mathematics pedagogy were primarily employed by district leaders explicitly charged with supporting mathematics education. The district mathematics coordinators promoted discourses that aligned with inquiry-based mathematics instruction, which reinforced more inclusive frames of mathematical activity and competence. While these discourses were encoded through formal mathematics curricular materials and other resources the mathematics coordinators shared, these discourses rarely penetrated other district leaders' policymaking. Moreover, there were competing discourses that aligned with more "traditional" and direct forms of instruction, emanating from the AID department—and encoded through their intervention systems—as well as teachers and community members.

Dominant Equity Discourses focused on Access, Achievement, and Identity

Equity was important to RockCity. Not only did the district have its own equity department, but the chief equity officer was a member of the cabinet. The district adopted its equity statement in October 2020, and this statement was oftentimes posted on official district communication, such as board agendas, presentations, and internal and public communication. This statement foregrounded issues of "inclusiveness" and "cultural competence" through "accept[ing], embrac[ing], and empower[ing] students and staff in their individual identities."

These ideas were also reflected in RockCity's equity trainings, which were required for all administrators, teachers, and staff. These trainings were informed by the district's work with the National Council for Community Justice (NCCJ) in St. Louis, and supported individuals in:

> peeling back the layers of your own socialization…what is it about the way I was raised and the messages that I heard that I'm taking into the classroom? So when I see someone, what is my automatic assumption about that student, just because of the messages that I've heard from family, friends, TV, whatever? And really start to challenge ourselves on those so that you can switch to allyship, which doesn't just mean I'm going to speak on behalf of that person, but like make a seat at the table for them to be able to speak as well (chief equity officer, interview 1, 220815).

In addition to supporting individuals to reflect on the ways their implicit biases shape their actions, these trainings also focused on helping people learn about how their (and others') experiences are shaped by their social identities. For example, the December 5, 2022 equity training for the curriculum and instruction department focused on supporting individuals' learning about classism and privileges related to class. In addition to learning (through watching a video) about wealth disparities in the U.S., participants were invited to reflect on how a person's economic class advantages or disadvantages their career opportunities by engaging in a scenario-based activity. Briefly, participants were given a colored piece of paper that assigned their socioeconomic class and walked through a series of hypothetical scenarios where those in the highest income brackets quickly made it to the metaphorical finish line with their “dream job,” while those in the lowest income brackets faced several obstacles (e.g., transportation; sick child) that negatively impacted their ability to secure their dream job. In short, RockCity’s equity trainings focused on supporting individuals’ learning about issues of identity, including how one’s cultural values may be different from others’, how people’s intersectional identities shape their experiences, and how privilege and oppression operate in schools and society. I name this focus of RockCity’s equity trainings as “issues of *identity*.”

These equity trainings played a prominent role in the district’s “equity theory of change.” According to the RockCity website, the theory of change (paraphrased to protect anonymity) included providing long-term professional development focused on cultural competence and understanding identity, privilege, and oppression. This professional development supported school staff to improve their relationships and interactions with others, “around not just race but also class, gender, sexual orientation, religion, and other identity areas.” Ultimately, these efforts would provide “better access to educational content,” eliminate “the achievement gap,” and lead to “improved achievement for all.” This theory of change positioned learning about issues of identity as effecting improvements in access and achievement. That is, addressing individual’s implicit biases through professional development was the means to improving access and achievement, which were the ends. This can also be thought of in terms of problems and solutions; disparities in access and achievement were the problems, and professional development and learning about issues of identity were the solutions.

Interviews with district leaders confirmed that equity and restorative practices trainings were the main lever (solution) of the district's equity work, and that the main problems were disparities, not just in achievement but also behavior. The director of school improvement and federal programs succinctly explained that the district's equity challenges were "the discrepancies in both discipline, grades, AP classes, participation, graduation rates between races. I mean, I think, that that's been very clearly explicit to us administrators, if not the teachers" (interview 1, 220906). These disparities were primarily between the district's white and Asian students, and other students of color, though the district also looked at other aspects of identity, including class and gender. These equity challenges were reported by all interviewed district leaders, as well as explicitly stated in official policy texts, like the district's continuous improvement plans and district leaders' presentations to the board (e.g., superintendent's report to the board, 220912).

To address issues of access and achievement, the district provided additional resources, like staff and instructional coaches, to "Title I schools"—schools with high percentages of students from low-income families. Moreover, the district worked to provide equitable access to advanced coursework and postsecondary education, through partnerships with Equal Opportunity Schools (EOS) and Advancement via Individual Determination (AVID). In RockCity, both these efforts explicitly targeted students from underrepresented populations (observation: 221202 leadership council). It is important to note here that, throughout the district, tracking was not inherently seen as inequitable (though there were some individuals that expressed concern, more on this later). Rather, the inequities were in the barriers to access such advanced coursework and in disparities in participation. In fact, the proposal to increase advanced opportunities in the middle school argued that tracking can address inequities, since “a failure to accelerate students appropriately exacerbates the achievement disparities between families with resources and those without.”

To some extent, this equity work being done at the district level resonated with RockCity teachers. At the June 13, 2022 board meeting, the RockCity chapters for the National Education Association and the Missouri State Teachers Association shared that they were creating a joint committee to investigate and address equity issues:

> Two years ago in June we called for meaningful racial and social justice reform on behalf of our students and colleagues in the wake of the murder of George Floyd and widespread protests that followed. The district produced a well-crafted equity statement which now accompanies school communication. Last year we asked for the district to continue the hard work of dismantling inequitable system that sustain the opportunity gap for our diverse learners, to extend equity training and restorative practices to all employee groups, and to rewrite policy so that our equity values statement stands for tangible actions.

This is not to suggest, however, that equity was accepted by everyone. One cabinet member explained that:

> I have people in the district going ‘I don’t even know why we're talking about this, everybody's the same, there's no difference between people.’ And I've had someone in the district, in a pretty high position, saying ‘Black kids only get referred more for discipline because Black kids obviously act out more’ (interview 1, 220815).

This was also evident at board meetings, where there was the occasional public comment from those that had concerns with and/or disagreed with the district's equity efforts (e.g., observation: 220509 board meeting).

In mathematics, discourses related to equity primarily attended to issues of access and achievement. For example, both mathematics coordinators viewed the mathematics instruction they were promoting as being equitable. For the elementary coordinator, one of the goals on her 2021-2022 strategic plan was to "increase stakeholder knowledge and understanding of equity based practices," which included instruction that focuses "on student math talk, manipulatives, creative problem solving, and multiple strategies" and formative assessments based on a progression of student thinking. Moreover, in the *Elementary Math Vision and Mission Statement*, equitable mathematics instruction included an "asset-based" perspective, and views that "everyone can do mathematics." It seems that this vision was aligned with the view that inquiry-based mathematics instruction is equitable, with particular attention to supporting students' positive mathematics identities.

This was also reflected in the secondary coordinator's vision, as inquiry-based instruction that focuses on student discourse is equitable because it is more effective for students of color:

> I'm really working more with like the *Five Practices* [*for Orchestrating Productive Mathematics Discussions*; Smith & Stein, 2018] and like getting teachers to involve more discourse and more cooperative work, because the research says that students of color learn better in a cooperative situation and so kind of, I don't know what we call it, kind of behind the scenes equitable PD, like

> I'm not saying we, we have to do this for equity but I like remind people, this is what the research says about how students learn, and we need to get curriculum that's you know more problem-based, and we need to have classes that are more engaging and just think about how we're delivering our content, because you know students all learn a little differently, so we need to not just do it one way (interview 1, 220414).

Here, the focus was on the achievement of students from historically marginalized populations, and ensuring their access to high-quality mathematics instruction. This, and the examples from the elementary mathematics coordinator, suggests that equity-related discourses in mathematics primarily focused on achievement and access to mainstream curriculum and teaching (e.g., NCTM-endorsed practices). Attention to identity was marginal, and only in relation to positioning students as mathematically competent and supporting positive mathematical identities; power was not addressed.

Overall, in RockCity, equity discourses were dominant, reflected in individuals' personal discourses, encoded in official policy texts (e.g., district equity statement), and enacted through district-wide efforts (e.g., equity trainings). These equity discourses were various: discourses focused on issues of identity (e.g., cultural competence) were enacted through solutions (e.g., equity trainings) to address problems focused on access and achievement (e.g., achievement gaps). In mathematics, equity discourses focused on access to inquiry-based mathematics instruction (as this instruction would support achievement), and, to a lesser extent, supporting students' positive mathematical identities.

Interdiscursivity with Accountability Discourses

Similar to RiverTown, accountability discourses were hegemonic in RockCity, and interacted with various mathematics-specific discourses. The power and influence of accountability discourses at RockCity was most obviously seen through the assessment, intervention, and data (AID) department. The AID department was formed six years ago in 2016, and the current director has been the director since its founding. According to the director, the AID department is:

> in charge of all of the state and local assessments. So part of that is, not only navigating that, helping those systems run smoothly, but also taking that data and making sure that is digestible by the schools, especially principals and teachers. And so we try to design all of our assessments in such a way that they can actually make it usable in the classroom. And that's not always easy to do, especially with the state tests. Intervention is the next stage of that where we have, we take that data that we get from assessments and from attendance and discipline and all that. And we help buildings establish data teams and student assistance teams and things like that (interview 1, 220505).

The AID department was in charge of processing a variety of assessments and data sources, including those from state accountability (e.g., MAP), as well as internal measures, like attendance, behavior, and i-*Ready* assessments. These were then distributed to teachers, principals, and district leaders to inform data teams, intervention systems, and even district and school continuous improvement plans.

Because mathematics and reading were the most tested subjects, via state accountability and local assessments, they were positioned as the most core. They received the most attention, where performance on mathematics and ELA assessments were prioritized in formal policy texts and district efforts. For example, the superintendent's report at the September 12, 2022 board meeting shared a variety of district data reports, including those related to teacher retention, attendance, and suspensions, as well as achievement. Achievement data included ACT scores as well as the percent of students who performed proficient or advanced on the state standardized tests for mathematics and communication arts (ELA); accountability data for science was not shared, even though there were science standardized tests. So, accountability discourses functioned to reinforce mathematics and ELA as the most core.

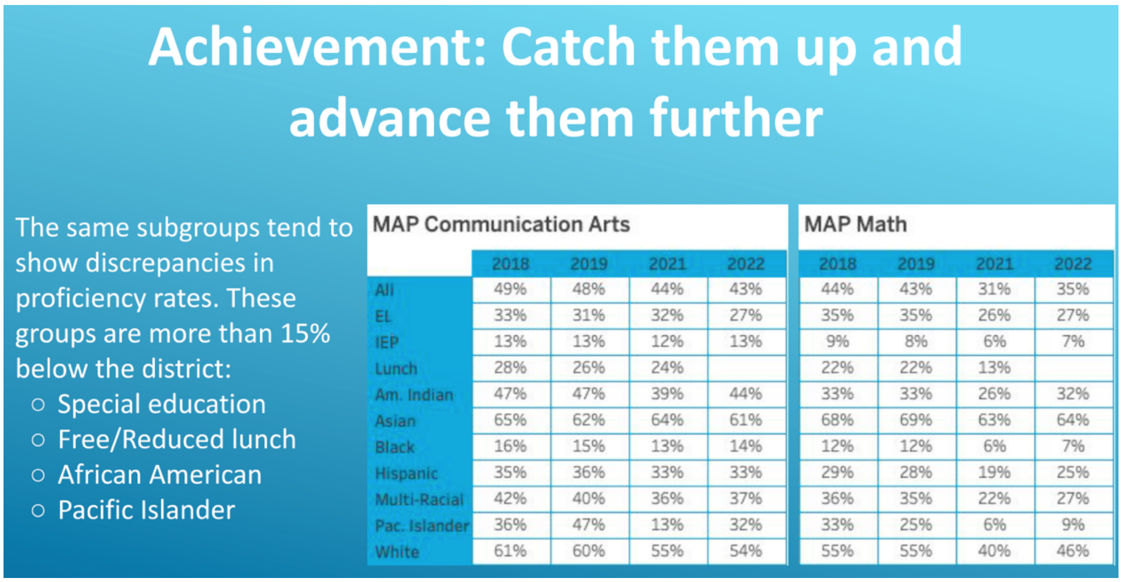
As described earlier, in RockCity, accountability language for labeling students was also applied to the *i-Ready* intervention system, where students were grouped into three levels—"below level," "on level" and "above level"—based on predicted proficiency on the state standardized test, and this determined which students needed intervention, and which intervention group students belonged to. So, accountability discourses were used to construct a *sequence* of mathematical learning, as well as a hierarchy of students and their mathematical competence. This sequence was predicated on standardized tests (state and *i-Ready*) that *defined* what counted as mathematical competence. This seemingly objective quantification was compatible with discourses about mathematics being well-defined and agreed upon, but conflicted with the pedagogy-related discourses promoted by the district mathematics coordinators. While accountability discourses only attend to mathematics as right and wrong, the mathematics coordinators' personal discourses promoted student sensemaking, discourse in mathematics, and positive mathematical identities. Indeed, the assistant superintendent of secondary education shared that “I’d love to see kids taking math because they love math, not because they just have to cross boxes off their transcript…I worry that our focus is too much about making a score and not about learning to love math” (interview one, 220520). Three other district leaders expressed similar concerns about the pressure of accountability as an obstacle to students’ learning of and experiences in mathematics.

Not only did accountability discourses define mathematical activity and competence, they also defined (in)equity. For example, the superintendent’s update to the board at the September 29, 2022 work session shared a variety of academic indicators (e.g., achievement scores, course taking patterns, graduation rates), as well as attendance and behavior. For each of these, data was provided for various student groups. Figure 8 is a slide from the superintendent’s presentation showing proficiency rates on the state standardized test for different student populations (artifact: superintendent’s report to the board, 220922 board work session). Here, “discrepancies in proficiency rates” across the different student subgroups were used to define inequity; this also suggests that evidence of “equity” would be a lack of discrepancy, or equal proficiency rates. This aligned with the equity theory of change shared earlier, where the end goal of equity work is the “elimination of the achievement gap.”

In RockCity, accountability discourses permeated several facets of district policymaking. They were reproduced in classrooms (e.g., intervention), schools (e.g., data teams), and in official district policy texts as well as district leaders’ talk. Traces of accountability discourses present with other discourses functioned to: reinforce mathematics (and ELA) as the most *core* school subjects; construct *sequences* in which mathematical learning (and students) progress; *define* mathematical activity and competence; and define *equity* as equal achievement across student populations.

Figure 8

Slide from Superintendent's Report to the Board



	MAP Communication Arts				MAP Math			
	2018	2019	2021	2022	2018	2019	2021	2022
All	49%	48%	44%	43%	44%	43%	31%	35%
EL	33%	31%	32%	27%	35%	35%	26%	27%
IEP	13%	13%	12%	13%	9%	8%	6%	7%
Lunch	28%	26%	24%		22%	22%	13%	
Am. Indian	47%	47%	39%	44%	33%	33%	26%	32%
Asian	65%	62%	64%	61%	68%	69%	63%	64%
Black	16%	15%	13%	14%	12%	12%	6%	7%
Hispanic	35%	36%	33%	33%	29%	28%	19%	25%
Multi-Racial	42%	40%	36%	37%	36%	35%	22%	27%
Pac. Islander	36%	47%	13%	32%	33%	25%	6%	9%
White	61%	60%	55%	54%	55%	55%	40%	46%

Summary

At RockCity, the mathematics SMC was characterized by explicit and visible discourses about mathematics as core, as well as implicit discourses about mathematics as sequential and defined, which were institutionalized in tracking and intervention structures and reinforced by accountability policies. Discourses about inquiry-based mathematics instruction contested with discourses about traditional, direct instruction. Equity discourses were various, and ranged from issues of access and achievement to identity. Throughout was also interdiscursivity with accountability discourses, and discourses about mathematical activity and competence.

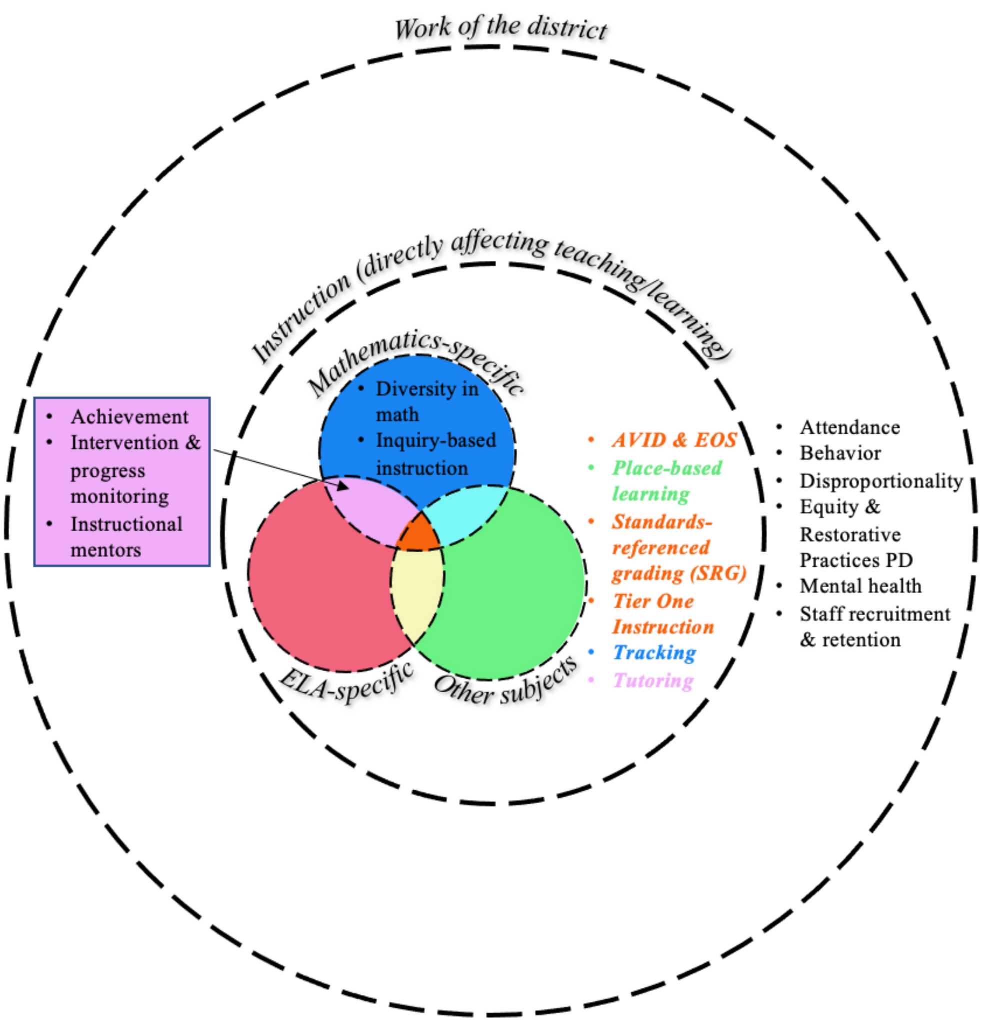
RockCity's Policy Boundaries

Similar to RiverTown, there were several policy boundaries operating at RockCity, where policies for mathematics were framed and negotiated in relation to these boundaries. Figure 9 represents the various policy boundaries operating in RockCity. The largest boundary labeled "work of the school district" represents the domain and responsibility of the school district. So, what fell inside this outermost boundary were various policies and efforts (i.e., what is in the bullet points, see Table 4 for a description of each policy) that RockCity and its district leaders were engaged in to support education broadly. The middle "instruction" boundary included subject-neutral policies that *directly* affect classroom teaching and learning (e.g., standards-referenced grading, tutoring), and distinguishes from other efforts that *indirectly* affect instruction (e.g., attendance, behavior, equity and restorative practices PD). These efforts that only indirectly affect instruction fell outside the "instruction" boundary, but still within the policy boundaries of the school district. Inside this "instruction" boundary were also subject-specific boundaries, including boundaries for mathematics, English language arts (ELA), and other subjects. Policies and efforts only for that subject fell within these subject-specific boundaries, with the pink intersection between mathematics and ELA including mathematics and ELA-differentiating policies. These policies are denoted by the pink box. Sometimes *crossing* into the subject-specific boundaries were subject-neutral policies that directly affect instruction, which are represented in Figure 9 by the names of these efforts being italicized and color-coded.

In the following subsections, I briefly discuss the three boundaries just described. Then, I analyze how the mathematics subject-matter context (SMC) shaped the framing of these policy boundaries.

Figure 9

Policy Boundaries at RockCity



Boundaries Defining the Work of RockCity School District

District leaders described their work and efforts to support education as informed by equity. As explained earlier, equity was important to the district, and this was reflected in the equity department, chaired by the chief equity officer, who was part of the cabinet.

Table 4
Description of RockCity's policies

Policy	Type	Description
"Achievement"	Problems and solutions encoded in official policy text (i.e., CSIP), and enacted via practices	Problem of student achievement in mathematics and ELA.
Attendance		Problem of low attendance. Solutions included incentives and data monitoring.
AVID & EOS		Programs to increase diversity and access to advanced coursework and college.
Behavior		Problem of discipline, especially disproportionate suspension for Black students. Solutions included behavior education plan and restorative practices training.
Equity & restorative practices training		Trainings for all staff to develop cultural competence, positive relationships, and understandings of identity, privilege, and oppression.
Intervention and progress monitoring		Intervention and progress monitoring in mathematics and ELA for all students grades K-10.
"Tier One Instruction"		Efforts to support high-quality general classroom instruction for all content areas, through instructional practices and administrators' observations.
Tutoring		Online tutoring for all subjects. In-person tutoring for mathematics and ELA.
"Staff recruitment and retention"		Problem of recruitment and retention for certified teachers, substitute teachers, and other staff.
Disproportionalities	Problem constructed through discourse	Problem of disproportionalities in attendance, behavior, achievement.
"Standards-referenced grading"	Solution encoded in official policy text	Grading based on mastery of skills and understanding. Implementation included development of proficiency scales and common assessments.
Tracking	Solutions enacted via practices	Separating students who take advanced courses from students who take grade-level courses. Mathematics has the most and earliest acceleration opportunities.
Mental health		Efforts to support students and teachers' mental health and wellness.
Diversity in mathematics		Partnership with local organization to identify and support students of color not originally enrolled in advanced mathematics.
Instructional mentors	Solution enacted via practices and positions	Instructional coaches and mentors for elementary grades, with a focus on supporting mathematics and reading.
"Place-based learning"	Solutions constructed through discourse	Efforts to make content more relevant, by learning in and through the places, ecologies, and communities in which students live.
Inquiry-based instruction		Mathematics coordinators' promotion of inquiry-based instruction through professional development, curricular materials, and instructional resources.

Note: Quoted policy labels are the district's. Otherwise, they are the researcher's.

Beyond organizational structure, four interviewed district leaders explicitly stated that equity permeated all the district's work. For example, the chief equity officer shared that "I've always seen equity and restorative practices as almost like the biggest circle, because I don't think those are things that we do. I think those are the way we do everything else that we do" (interview 2, 221216).

Similarly, the director of curriculum and instruction shared that:

> you could put equity around all of this, around every single piece. Because to me, there's equity in access to attendance. Do you have transportation that's consistent? Do you have equity in how behavior is handled? Do you feel like you have equitable access to tier one instruction and to standards and to place based opportunities? Right. So, I mean, to me equity is all of those things (interview 2, 221208).

So, equity was a lens through which the district conducted all aspects of their work, from issues of transportation and behavior to curriculum and instruction. It is important to note here that

the director of C&I, in the quote above, highlighted equity as access. While this was a common equity discourse employed in RockCity, as described earlier in the mathematics SMC section, there were also equity discourses about identity-related issues.

For RockCity, the various efforts they engaged in were under the purview and scope of the district because they all affect student learning. One department director explained that:

> They [mental health efforts, restorative practices professional development, etc.] are not directly related to achievement, but they're also so integrally entwined in

> achievement that you really shouldn't take them out. Like, you know, we get comments from the community all the time, you know, and not just [RockCity] schools, everywhere. Well, "you guys are doing things that, you know, you should just be focusing on achievement. You're doing all this stuff around mental health and restorative practices and all these other things. And you don't need to be doing that." Well, our argument back is always "yeah, but if we don't do those things, many families don't either. And then it comes out in the schools, and then we have to deal with it in order for achievement to occur" (interview 2, 221208).

For this district leader, efforts that are "not directly related to achievement" were still within the role and responsibilities of the district because they affect student learning and "comes out in the schools." These efforts were "integrally entwined" and must be addressed "in order for achievement to occur." This suggests that the boundaries defining the work of the school district included all issues and efforts that affect teaching and learning. Moreover, by characterizing some efforts (e.g., mental health efforts, restorative practices professional development) as only indirectly related to achievement, the AID director alluded to another boundary that delineates efforts directly related to achievement, and other efforts indirectly related.

Boundaries around Instruction

The boundary referred to in the quote above is represented in Figure 9 by the middle "instruction" boundary, which included district-wide efforts that *directly* affect classroom teaching and learning (e.g., standards-referenced grading, Tier One instruction). Outside this boundary fell efforts that were perceived to only *indirectly* affect instruction, such as issues of attendance, behavior, equity and restorative practices professional development, and mental health.

In framing this boundary, and delineating whether an effort directly affected instruction, four RockCity district leaders explicitly discussed how issues that indirectly affect teaching and learning need to be addressed prior to effective classroom instruction. For example, the director of curriculum and instruction shared that:

> you have to Maslow before you can Bloom, right. You have to get them ready to learn before they can access the learning. So you could put all of these things in place as far as high level of instructional strategies. But if you can't get them there and engaged, it doesn't matter (interview 2, 221208).

Here, getting students “ready to learn” (i.e., efforts that address Maslow’s "hierarchy of needs”; Maslow, 1943) like supporting attendance and behavior (“if you can’t get them there and engaged”) were perceived to be necessary for but also prerequisite of high-quality instruction (i.e., efforts that address Bloom’s taxonomy; Bloom et al., 1956). This served to position such efforts as the work of the district, but outside the “instruction” boundary.

This boundary was also related to RockCity’s organizational structure and who had control over particular matters. For example, the director of school improvement and federal programs explained that some efforts fall outside the “instruction” boundary because:

> Curriculum coordinators are not tasked with anything about attendance, behavior, disproportionality. They're aware of it and asked to look through their lens at ways that we help with it, but they are not charged with delivering that message,

> incorporating…And so many of those are more, I don't know if administrative is right. But those are more managed by cabinet-level folks (interview 2, 221213).

Here, a distinction between efforts that fell inside and outside the “instruction” boundary was workflow and who was responsible or in charge of that effort. Efforts that fell outside were those managed by cabinet-level district leaders, while those that fell inside were the tasks of curriculum and instruction coordinators. Three other district leaders also shared that the efforts outside the boundary were those that were outside the “control” of teachers and their classrooms. For example, behavior and discipline issues were being addressed at RockCity through the creation of a new behavior education plan. This was initiated and facilitated by the equity department, with input primarily from principals and assistant principals, those who oversaw daily discipline issues; teachers and curriculum and instruction coordinator were rarely involved in this effort.

More broadly, the elementary mathematics coordinator explained that policy boundaries in the district were a function of organizational boundaries:

> I think people just tend to compartmentalize. There’s the curriculum and instruction, and then there’s everything else. And perhaps part of it is because of the way our entire system is organized. Like, there’s a curriculum and instruction department. I’m in it, right? And there’s the AID department, assessment, intervention and data. And there’s behavior people, and even within our behavior, there’s the SPED [special education] behavior and the non-SPED behavior people. So this specialization, which, I mean, when you’re big, I don’t know how you don’t specialize. But then we don’t have, and maybe we’ll start with some of

> this, that we don't have that intentional collaboration and crossover between the different departments (interview 2, 221201)

Departmentalization at RockCity allowed for specialization, but also prevented collaboration and crossing between groups of people. This resulted in policy boundaries where there are issues related to curriculum and instruction—the middle "instruction boundary—"and then there's everything else"—what falls outside the "instruction" boundary.

Within this "instruction" boundary, but outside the subject-specific boundaries, were efforts that directly affected instruction, across all the content areas. At RockCity, this included efforts to support marginalized students' participation in advanced coursework and higher education (through AVID and EOS), place-based learning, standards-referenced grading (SRG), Tier One Instruction, tracking, and tutoring. These were subject-neutral in that they treated all subjects equally or ignored subject-matter. For example, efforts to support Tier One instruction included principals and district leaders conducting classroom observations—or "instructional walks"—with a common protocol (artifact: focused instructional walks observation tool). This protocol was used across the district, regardless of grade level or content area. So, this protocol ignored the subjects that teachers teach and treated them as not relevant to evaluating and supporting instruction.

Some subject-neutral efforts also crossed into specific subjects, when some subjects were prioritized (e.g., tracking in mathematics; tutoring in mathematics and ELA; place-based learning in science and social studies) or there was work to support subject-specific implementation. For example, to support standards-referenced grading, coordinators, with their respective departments, developed proficiency scales and common assessments for each subject. In Figure 9, this crossing is represented by the names of these efforts being italicized and color-coded.

Subject-Specific Boundaries

Like with RiverTown, falling inside the "instruction" boundary were subject-specific boundaries, including a mathematics-specific boundary, an ELA-specific boundary, and an "other subjects" boundary that represents the less core subjects, like science and social studies. Because mathematics and ELA were the most prioritized subjects in RockCity, they were the target of subject-specific and subject-differentiating policies, including a focus on achievement, and efforts like intervention, progress monitoring, and instruction coaches and mentors. In Figure 9, efforts that were only for mathematics and ELA fell within the pink intersection and these efforts are written in pink text.

The boundaries of mathematics education policy at RockCity were a bit disjointed, in that there were policies and efforts for mathematics handed down from the cabinet, and other work pursued by the district mathematics coordinators and their teams. The former set of policies were defined by the problem of achievement, with solutions like intervention and progress monitoring, instructional coaching, and tutoring all rationalized as directly addressing mathematics (and ELA) achievement. The efforts pursued by the mathematics coordinators were less motivated by the problem of achievement, and worked to promote inquiry-based mathematics instruction and diversity in mathematics. This latter set of efforts involved primarily the coordinators and their teams, with little support from the cabinet and other district leaders.

Boundary Framing and the Mathematics Subject-Matter Context

In this section, I report on how the mathematics subject-matter context (SMC) shaped the framing of the policy boundaries just described. I found that, at RockCity, the ways in which the mathematics SMC interacted with boundary framing were mediated by organizational boundaries. Because of the hierarchical structure at RockCity, there were at least two levels of district-level policymaking. The cabinet members authorized top-down policies, and middle-level district leaders (e.g., district mathematics coordinators) were tasked with enacting those policies. Middle-level district leaders also pursued policies and efforts independent of the cabinet members. Moreover, there were departments (e.g., equity; AID; curriculum and instruction) with specific areas of expertise and authority, with limited communication and crossing among departments. This departmentalization simultaneously allowed for expertise and attention to specific schooling domains, while creating physical and epistemological boundaries. In other words, the presence of subject-specific personnel facilitated uptake of subject-specific policies, but different priorities among different departments sometimes resulted in competing demands, and therefore competing discourses, which needed to be negotiated in enacting district-wide policies.

Understanding these organizational boundaries at RockCity reveals that there were four mechanisms through which the subject-matter context (SMC) shaped boundary framing. First, at the cabinet level, the mathematics SMC provided discourses that constructed achievement as the criterion for determining mathematics and ELA-differentiating policies—policies that prioritized these two school subjects. Second, the mathematics SMC provided discourses that mathematics coordinators negotiated to enact top-down mathematics-differentiating policies authorized from the cabinet, as well as other mathematics-specific efforts they independently pursued. The boundaries of mathematics education policy included not only these mathematics-specific and mathematics-differentiating policies, but also subject-neutral policies that crossed into mathematics. Constituting the third and fourth boundary framing mechanisms were two ways that the mathematics SMC shaped subject-neutral policies' crossing (or not) into mathematics. Mathematics-specific discourses 1) supported the crossing of subject-neutral policies into the mathematics boundary or 2) delegitimized a mathematics-specific form of a subject-neutral policy.

To illustrate these four boundary framing mechanisms, I focus on key policies and efforts that RockCity engaged in. I begin first with describing how mathematics-differentiating policies dictated by the cabinet met the criterion of achievement. Then, I discuss how middle-level leaders negotiated the mathematics SMC to enact mathematics-differentiating policies and mathematics-specific policies. After, I discuss how mathematics-specific discourses shaped the (non)crossing of subject-neutral efforts into the boundaries of mathematics education policy.

Mechanism 1: Achievement as Criterion for Top-Down Mathematics-Differentiating Policies

At RockCity, mathematics and ELA were the targets for subject-differentiating policies. This was because these two subjects were considered the most core—mathematical knowledge was important for learning other subjects, as well as for life in general. Discourses about these subjects as core were intensified by accountability discourses, and converged to construct achievement in mathematics (and ELA) as problematic. All interviewed district leaders reported that a district challenge was low test scores, specifically in mathematics and ELA (also artifact: EGL Goal presentation). The secondary mathematics coordinator explained that:

> those are the two subjects that they're always in the public and what they really report out on in terms of tracking growth over time. Like those are the scores they looked at. Are they going up, staying the same, going down, and so we, I feel like that gap is, we bear a little bit more of that pressure (interview 1, 220414).

This suggests that discourses about accountability and mathematics as core worked together to frame the problem of achievement as falling within the boundaries of mathematics (and ELA), and outside the boundaries of other subjects.

This focus on achievement was most apparent in the district's strategic planning. Not only did the district's continuous improvement plans (2018-2022; 2022-2027) target only mathematics and reading/literacy for the goal of achievement on state standardized tests, but the strategic plans for the elementary and secondary mathematics coordinators (2021-2022; 2022-2023) also had achievement-focused goals, with their lag measures as standardized state test scores.

To address the problem of achievement, mathematics and ELA were the recipients of additional resources and attention. For example, during the 2021-2023 school years, through federal ESSER [Elementary & Secondary Schools Emergency Relief] funding, the district employed instructional mentors and coaches (IMs, ICs, respectively) for reading and mathematics at the elementary levels. This was because, according to the assistant superintendent of elementary education, "math has really taken a hit right now. Guess what we did. Hey, hire instructional coaches for it" (interview, 220906). Though IMs and ICs supported teachers in other subject areas and other aspects of teaching and learning (e.g., behavior management), the district expected their time to mostly focus on mathematics and ELA (artifact: September 9, 2022 IMs/ICs meeting).

RockCity also used ESSER funding to provide online tutoring services to students for all subjects (artifact: TutorMe proposal). Mathematics and ELA also received additional tutoring services, where secondary teachers were compensated to provide in-person tutoring after school. These subjects were targeted "to address learning loss caused by the COVID-19 pandemic" and because "ESSER funds pay for tutoring in these content areas. Math and ELA content are the most frequently assessed and reported on." Here, accountability discourses emanated from federal funding guidelines to construct the problem of achievement, in the form of "learning loss," for the subjects of mathematics and ELA (artifact: ESSER tutoring secondary school guidelines).

So, the boundaries around mathematics education policy were defined by the problem of achievement, where in-group status was determined by whether or not a policy, in part, addressed mathematics learning outcomes. Instructional coaching and tutoring met this criterion, and therefore fell within the boundaries. Intervention also met this criterion. In the following, I use the example of intervention to illustrate how this effort met the criterion of achievement and how accountability discourses intersected with other mathematics-specific discourses to legitimize mathematics as the target for intervention. It is important to note here that the mathematics- and ELA-differentiating policies I've described thus far (i.e., instructional coaching, tutoring, intervention) were top-down policies authorized by the cabinet. This had implications for not only how these specific efforts were then negotiated and enacted by middle-managers, but also policymaking for other efforts at the middle-leader level. I'll address these after first discussing the policy decision to pursue intervention.

Intervention for Mathematics and ELA in Elementary Schools. Intervention had been in RockCity for a while, in both mathematics and ELA, though in various structures and capacities. The prevalence of intervention in the district was most apparent in the fact that the district had an entire office dedicated to intervention, in addition to assessment and data (AID department). Intervention's presence in the district was also strongly related to its connection to assessment, as evidenced by the AID office. In particular, assessment had become a greater focus with the new superintendent. The C&I director explained that:

> [the superintendent] is wanting, for lack of a better word, a regular cadence to see how students are moving towards those priority standards that are measured through our state assessments. So how can we create that cadence that tells us if we're moving students or students are moving to mastery (interview 1, 220505).

For the superintendent, assessment was important to track students' "mastery" towards standards that are tested on state assessments. This resulted in the adoption of *i-Ready* for reading and mathematics in grades K-8. Per the new assessment plan for 2022-2023, which was drafted by cabinet members with feedback from teachers through various teacher advisory committees, all students K-8 were assessed and monitored three to five times per year, and that this would "improve student performance and achievement" by "provid[ing] the necessary information to improve curriculum and instructional practices." These quotes suggest that assessment was rationalized as solving the problem of achievement.

This new assessment system supported intervention. At the elementary level, there had been a district-wide expectation for ELA intervention for several years, but there was not yet a policy for mathematics during the 2021-2022 academic year. In the spring of 2022, with the release of the new district assessment plan, intervention for mathematics in all elementary schools was formalized for the following school year, which included 30 minutes of intervention time each day in the elementary school schedule (observation: 220503 elementary coordinator meeting). Through *i-Ready* progress monitoring, students who "are not on track to be proficient on the MAP by the end of the school year" were identified for intervention. Here, *i-Ready* data determined what intervention was for (i.e., proficiency on MAP test), as well as which students needed intervention.

It was clear that mathematics was targeted for intervention because intervention was a solution to the problem of achievement. This was made explicit by the assistant superintendent of secondary education, as one of her goals for the 2021-2022 school year was to:

> By May 2022, successfully develop and implement an evidence-based model of intervention (MTSS) that uses data-based problem solving to integrate academic and behavioral instruction and intervention, thus engaging scholars, and raising iReady scores 3-5%. This is crucial to expand and support quality Tier 1 instruction, identify and remediate learning loss, and improve Math and Reading 6-12 (artifact: assistant superintendent's SMART goals).

Here, the assistant superintendent connected intervention to the problem of "learning loss"—a COVID-19 pandemic form of the problem of achievement—and focused only on reading and mathematics as important subjects for intervention. Likewise, the district's continuous plan and the superintendent's presentation to the board at the September 12, 2022 board meeting explicitly positioned intervention as a solution to the problem of achievement.

Mathematics and ELA were also the targets for intervention because they were viewed as inherently sequential, which was compatible with intervention. For example, the director of AID explained that mathematics and ELA consists of "a progression of skills that build on each other," and this allows teachers to "go back and find the skills that the student is missing, to help them with what they're doing right now" (interview 1, 220505). By contrast:

> the other subjects, science, social studies, things like that, the interventions in those areas are less linear, if that makes sense….In science and social studies, it's like a unit on a particular subject. In science, you do have the math that relates to that and how you interpret data and things like that, but I don't necessarily need an intervention on Egyptian history (interview 1, 220505).

In the AID director's view, it is more challenging to implement intervention in less-linear subjects like science and social studies because an intervention on Egyptian history, for example, would not support students to learn Greek history.

This sequential nature of mathematics and ELA was compatible with the *i-Ready* assessment system. As described earlier, the diagnostic reports that were shared with teachers and principals "presented [data] in three groupings (below level, on level, and above level)" which "mimics the state proficiency levels" (assessment plan for 2022-2023). This hierarchy of students and their mathematical competence, predicated on standardized testing, was compatible with an imagined sequence of mathematical topics that need to be mastered in a particular order. These sequences in the assessment system then allowed teachers to create hierarchical groups for intervention.

Overall, the mathematics SMC at RockCity intersected discourses about the sequentiality of mathematics with accountability discourses to frame intervention as a solution falling within the boundaries of mathematics education policy. Intervention was compatible with the sequential nature of school mathematics, and helped solve the problem of achievement, which was important to the district because mathematics is core and heavily tested. For this top-down policymaking, the mathematics SMC seemed to be most powerful with respect to discourses about mathematics as core—reinforced through accountability discourses—and to some extent, mathematics-as-sequential. By contrast, discourses about mathematics pedagogy and equity were not powerful in shaping boundary framing. These discourses came more into play with respect to policymaking at the middle-leader level, which I turn to this next.

Mechanism 2: Subject-Matter Context Negotiated by Middle Leaders in Enacting Mathematics-Differentiating and Specific Policies

As just described, in RockCity, top-down decisions authorized from the cabinet determined why subject-differentiating policies (e.g., instructional coaching, tutoring, intervention) fell within the mathematics boundary. With respect to the mathematics SMC, these top-down decisions institutionalized and reinforced accountability discourses and discourses about mathematics as sequential, which interacted with the personal discourses of middle-level leaders (like the mathematics coordinators). This then shaped not only how those specific efforts were then negotiated and enacted by middle-level leaders, but also policymaking for other efforts at the middle-leadership level.

For example, processes for determining which mathematics curricular materials RockCity would adopt was managed by the district mathematics coordinators and their teams, but the SMC provided dominant discourses—enacted in policies and promoted by cabinet-leaders—that penetrated and shaped this policy enactment. For example, in a meeting deciding the timeline and direction for new curricular materials for elementary mathematics (observation: 221212 elementary mathematics curriculum meeting), the elementary mathematics coordinator shared that the district might select new curricular materials that are “more focused on conceptual understanding and going deeper, instead of just about answers and computations.” The assistant superintendent of elementary education then responded:

> I don’t disagree with anything that we’re saying. Our student outcomes, right, when we talk about starting the academic school year out with, for instance, I’m just going to use *the i-Ready* as a metric. Less than 10% have a level of proficiency. We’re growing, which is a plus, because it did jump in that second progress check. But we’re still under 15% proficiency. So I think the question is understanding philosophical differences with regard to, are we looking at the process of the students’ learning versus the outcome of student learning. We’re still being held accountable to those outcomes.

Here, the assistant superintendent acknowledged the mathematics coordinators’ personal discourses related to mathematics pedagogy (“philosophical differences with regard to…the process of the students’ learning”), but explained that the ultimate determining factor was student learning outcomes that the district is held accountable to (from the state, community). This illustrates how middle leaders, in this case the elementary mathematics coordinator, had to negotiate different—and sometimes conflicting—discourses in their policy enactments. Because mathematics was so heavily tested, accountability discourses oftentimes penetrated middle leaders' policymaking, as was the case here with curricular materials.

To elaborate on the ways in which the mathematics SMC shaped policy enactment and boundary framing at the middle-leader level, I examine two policies in-depth: intervention and equity in mathematics. I begin first with mathematics intervention in the elementary schools.

Mathematics Intervention in Elementary Schools. As described earlier, the decision to institutionalize mathematics intervention across the elementary schools was authorized at the cabinet level. Enacting intervention, however, was negotiated at the middle-leader level, specifically among the AID department and the elementary mathematics coordinator and her team. In other words, intervention acted as a boundary practice between AID and mathematics. This was explicitly represented in the elementary mathematics coordinator's strategic plans for 2021-2022 and 2022-2023, as the AID office was listed as a resource for the goal to "increase the development and implementation of a multi-tiered system of support for all exception learners."

The director of AID similarly explained that his office worked closely with the mathematics department, and that there was overlap in their roles:

> I have to be careful, of course, to stay in my lane. However, there is significant overlap between instruction and intervention. There has to be. So, it is a combined

> effort between the two departments. I don't have any say, nor do I need to have any say on the curriculum that they choose or the instruction, instructional practices they choose. However, when it comes to the intervention, we work together…So, but I will help with choosing the interventions. I don't choose them myself, it's a team effort. Making sure that those interventions are consistent with our instruction philosophies as much as possible (interview 1, 220505)

Here, he explained that intervention and instruction were not just different departments, but also different practices. The C&I department's purview were curriculum and instruction, while his "lane" was intervention. However, there was collaboration among the two departments in choosing interventions. The AID director suggested that this collaboration involved negotiating the alignment between interventions and "instructional philosophies."

For the elementary mathematics coordinator (EMC), however, intervention did not align with what she believed to be effective mathematics instruction. In the (interview 1, 220412) excerpt below, she explained:

> EMC: Definitely AID would like to see math intervention. There are teachers that are asking for it as well, and they see students are struggling in their classrooms and they want a way to support them and the system for ELA is set up in such a way, where it is. I don't know how effective it is, but it is really clear of what to do, right. You've got students scored here, you give them this assessment, you give them this intervention. It's very prescriptive. But then you have students that are in the same intervention for three years straight, so how effective is that?

PN: So it seems like these efforts in ELA are kind of making their way into math?

EMC: Yes, yes. So, as much as possible, if they're asking for things and I want to hand them things, I want to give them things that I believe are healthy for kids and for good instruction and not memorization and procedural-based, right. Because the odds are, if they're needing additional support, they don't need more memorization or procedure, they need number sense routines and they need flexibility and composing and decomposing numbers and strategies and all of those things.

Here, she explained that intervention as implemented in ELA was “prescriptive” and “really clear of what to do,” and was concerned that mathematics intervention would likely mirror ELA intervention, focusing on memorization and procedures rather than number sense. This seemed to be a tension between her personal discourses about mathematics learning as sensemaking and flexibility with numbers, and discourses about procedures and memorization. The latter were dominant social discourses, as they were promoted by the AID office, enacted in policies and routines that were implemented in ELA, as well as teachers’ personal discourses. This suggests that broader discourses about intervention and assessment, as well as discourses about other subjects, namely ELA, were shaping the mathematics SMC. Moreover, by emphasizing the different pedagogical commitments, the mathematics coordinator called attention to a boundary between the mathematics team and AID/ELA. As shared earlier, the director of AID also alluded to this tension, as well as three other district leaders.

In enacting mathematics intervention policies authorized by the cabinet, the elementary mathematics coordinator worked to shift the boundaries around what counted as mathematics intervention, away from memorization and procedures, and towards number sense. Such boundaries were negotiated during a meeting (observation: 2205010 mathematics and AID meeting) to determine the intervention system for mathematics, and included the EMC, the mathematics instructional mentors (IMs), and the director of AID. This meeting was organized by the EMC, and began with her referring to the meeting agenda (that she crafted) and reading that the goal of the meeting was "to design a clear intervention protocol focused on conceptual understanding that builds from student strengths" (artifact: May 10 agenda). In doing so, she explicitly positioned "conceptual understanding" and "builds from student strengths" as two criteria that would determine what counts as an acceptable mathematics intervention. Other interventions that did not meet these criteria would be deemed as unacceptable. The IMs agreed with her framing; the AID director did not disagree. It is important to note here that there was latitude for the EMC and AID to determine an intervention protocol because, "intervention in math is still an area of growth" (artifact: 22-23 assessment plan). That is, there was no readily available program (like *i-Ready*) that could be implemented for elementary mathematics intervention, so this policymaking was under the discretion of the EMC, the director of AID, and their respective teams.

Though designing a mathematics intervention system was negotiated among middle leaders, it was also dependent on the *i-Ready* system, which provided student data and grouped students by proficiency levels. As such, this assessment system encoded discourses about the sequentiality and well-defined nature of mathematics that middle-leaders had to negotiate in their policy enactments. For example, the EMC expressed concerns about the limitations of *i-Ready*'s reports, as it only included information about the correctness of student's answers, and not information about their mathematical thinking. The AID director agreed with this framing, but suggested that *i-Ready* was helpful in revealing students' "level of skill" and where teachers should focus instructionally, and that this was important "since math builds upon itself."

Such discourses about the sequentiality of mathematics seemed to be important, as when the EMC proposed that mathematics interventions in elementary should focus on number and operations (as opposed to geometry or measurement), the AID director agreed, stating that "when you look at kids in middle school, they're struggling because of number." The mathematics IMs also agreed. These discourses about mathematics as sequential came up again, when the EMC proposed that the different interventions for different intervention groups could mirror the progression mathematical reasoning develops through: counting, addition, multiplication. This resonated with the IMs, as this progression focused on students' conceptual understanding (rather than procedures) and aligned with an effort they engaged in earlier in the school year (developing strategy guides for common formative assessments which focused on student thinking and how it progresses).

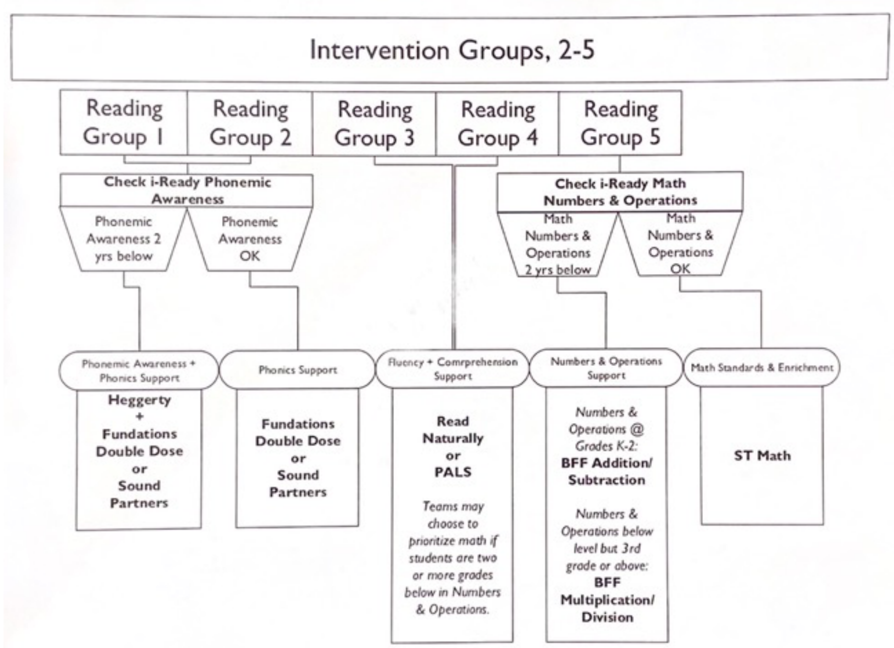
The frame of interventions as "counting," "addition," and "multiplication" was resonant, as this became a criterion to which participants consistently returned in deciding the mathematics intervention system the district would adopt. Eventually, the group decided that *the Building Fact Fluency* (BFF) Kits would be the adopted intervention system for mathematics. These kits aligned with the progression, as there was a kit for addition, and another kit for multiplication. These kits were also the resources the EMC and IMs had been promoting throughout the 2021-2022 school year for teachers to use to support students' number sense (e.g., in professional development; 221109 elementary professional development schedule). In her interview, the EMC explicitly framed these kits in opposition to other resources that focus on procedures and memorization.

To determine which intervention (addition, multiplication) students would be assigned to, the group decided that they would use *i-Ready*'s designation of student's grade level for the "Numbers & Operations" domain. Indeed, the final intervention protocol (see Figure 10) assigned students to one of the BFF Kits if they were two years "below level" based on *i-Ready* reporting, or *ST Math* if they were on grade-level for mathematics and reading. For students assigned to mathematics intervention, students in grades K-2 would participate in the addition and subtraction kit, while students in grades 3-5 would participate in the multiplication and division kit (because these standards are more prevalent in the older elementary grades). It is important to note here that where students were assigned to for intervention was a negotiation between the demands of mathematics and ELA. For students who were "below grade level" for both subjects, teachers had discretion for which content area intervention students would be assigned to.

Overall, policy enactment of mathematics intervention at RockCity was a negotiation among middle leaders, specifically, between the AID department and mathematics-specific district leaders. The EMC and her IMs were successful in (re)framing the boundaries of mathematics intervention to be defined by conceptual understanding, as evidenced by the decision to adopt the BFF kits as the intervention system. This was in spite of the dominant discourses related to ELA intervention about memorization and procedures. Conceptual understanding, through the progression of how students' mathematical reasoning develops (from counting, to addition, to multiplication), was compatible with discourses about mathematics as sequential, and with *i-Ready*'s grouping of students as below, at, or above grade level. This seemed to legitimize the BFF kits as the intervention system of choice.

Figure 10

RockCity Intervention Groups for Grades 2-5



There was, however, less emphasis on the other criterion for mathematics intervention: builds from student strengths. One reason might be that *i-Ready*'s reports focused on what students do not know (deficit-based). Another is that intervention, at RockCity, attended to what students are lacking. This was most apparent in the use of the years in which students are "below" to determine their intervention grouping. This suggests that the mathematics SMC was more amenable to intervention as defined by conceptual understanding (through sequentiality), since discourses related to student assets were incompatible with narrow views of mathematical competence (attending to student deficits based on standardized test).

Equity in Mathematics. In addition to enacting district-wide efforts, like intervention, the district mathematics coordinators also engaged in efforts of their own, including supporting equity in mathematics. Both leaders saw their efforts to support inquiry-based instruction and curriculum as being equity-minded. As described earlier in the equity discourses section, the mathematics coordinators viewed inquiry-based mathematics instruction as equitable because it supported students' positive mathematical identities, and it was more effective for students of color. For example, the secondary mathematics coordinator asked teachers to pilot *Illustrative Mathematics* as potential new curricular materials, and this curriculum was chosen because the "research shows that problem-based curriculum is more engaging for students. African American students learn better in small groups, with more discourse" (observation: 220419 mathematics department meeting). Through the semester in which teachers piloted these materials, the coordinator collected data, including a variety of achievement indicators (e.g., grades, drop and failure rate) as well as data on students' mathematics identities and attitudes. The coordinator explained that she collected both data sources because:

> Even if the grades stayed flat, if kids show that 'I have a better disposition towards math now, I don't hate it. I believe my teacher helps me. I believe I can do math.' To me, that's a win also, because that just leads to, I think, eventually will lead to achievement, if we're not seeing that already. So I don't know, I just think that how a person feels about their ability to do math can really be a barrier or a boon for them, you know, moving forward (interview 2, 221130).

Here, inquiry-based mathematics instruction was considered to be more effective—in terms of achievement—for students of color because it supports positive mathematical identities ("how a person feels about their ability to do math can really be a barrier or a boon"). This suggests that the coordinators' efforts to promote equity in mathematics primarily consisted of supporting access to inquiry-based instruction. The focus was on achievement and access, with some attention to identity in relation to positioning students as mathematically competent and supporting positive mathematical identities.

Both coordinators also engaged in efforts to "increase the proportion of students of color and F/R lunch [free or reduced price lunch] in advanced math classes to more closely mirror the school-wide proportions" (artifacts: 2021-2022 and 2022-2023 strategic plans for both coordinators). This was a new effort that started in the 2021-2022 school year in collaboration with a local community organization, and was piloted with students at one middle school. As part of this effort, students of color not originally identified for advanced mathematics were encouraged to enroll in those advanced courses, which included additional in-class support from volunteer mathematics mentors. Within the existing tracking structure, this effort worked to remove barriers to access advanced mathematics, such as enrollment criteria that disadvantage students of color. The secondary mathematics coordinator engaged in other efforts to make tracking more accessible, which will be discussed in a later section.

Again, this equity effort focused on access and achievement, even though there was an emphasis on issues of identity with respect to intentionally supporting students of color. It is important to note here that this equity effort stemmed from the coordinators, and not the cabinet. In fact, the funding for this effort came from the local community organization, with no current financial backing from the district (besides the “time” invested by the mathematics coordinator). This suggests that this equity effort was shaped by the coordinators’ own personal discourses. For example, the secondary coordinator shared that "as a high school teacher I was so discouraged that we had so few students of color in our upper level math classes. So I really want to change that” (interview 1, 220414). This focus on equitable participation in mathematics was compatible with the district’s focus on achievement (gaps) as measured by standardized tests, as well as advanced coursework and postsecondary education, through partnerships with Equal Opportunity Schools (EOS) and Advancement via Individual Determination (AVID).

Overall, the mathematics coordinators’ equity efforts focused on access and achievement, with some attention to issues of identity, including attention to supporting positive mathematics identities and the success of marginalized student populations. Because both these equity efforts were primarily enacted by the mathematics-specific leaders, without negotiation with other district leaders (unlike the case of intervention), the leaders’ personal discourses were primarily influential. This is likely also because the mathematics leaders’ personal discourses focused on access and achievement were compatible with the dominant equity discourses reflected in the mathematics SMC, as enacted in the district’s challenge of mathematics achievement (gaps), which was identified by all interview participants and was a goal on the district’s continuous improvement plans.

Mechanism 3: Subject-Matter Context Facilitated Crossing of Subject-Neutral Instruction Policies

Because there were subject-specific personnel in RockCity, policies related to issues of curriculum and instruction oftentimes crossed into the boundaries of specific content areas. Sometimes, this was from top-down direction from the cabinet. For example, to implement standards-referenced grading (SRG), all content area coordinators were expected to work with their departments and teachers to develop critical concepts and progression scales, as well as common assessments—this crossing is represented in Figure 9 by orange color code. This crossing was shaped by the SMC, that of mathematics and other content areas. For example, at SRG meetings among C&I coordinators and building principals (e.g., observation 220502 secondary SRG meeting), several coordinators advocated for specific grading criteria based on what "performing" in their subjects looked like (e.g., tests versus projects). As another example, teachers were expected to give students a score for each critical concept, though sometimes the content had not yet been covered, so it was not possible for students to receive the score indicating mastery (3). In the weekly curriculum and instruction newsletter (artifact: October 17-21, 2022 C&I newsletter), the elementary mathematics coordinator advised that "Science, Health and Social Studies is always 3 [score] because they complete the unit and have opportunities to meet the standard. ELA and Math are different because of the spiral." Here, discourses about differences in curriculum and content coverage ("spiral") across the content areas shaped policy enactment of SRG.

The mathematics coordinators also purposefully supported subject-specific implementation of district-wide efforts (i.e., crossing subject-neutral policies into mathematics) to enact their own agenda. For example, the secondary mathematics coordinator worked to integrate specific AVID instructional strategies into mathematics professional development to promote more collaboration and discourse in mathematics teaching (observation: 220808 mathematics department retreat; artifact: 220921 mathematics professional development schedule). As another example, the elementary mathematics coordinator designed common formative assessments that supported teachers' reporting for SRG, as well as their learning of and attention to student thinking. In both these examples, the coordinators' personal discourses about mathematics pedagogy (e.g., lessons with discussion; focus on student thinking) were powerful in crossing these policies—AVID instructional practices; SRG—and influencing what the mathematics-form would look like.

To further elaborate on the ways in which the mathematics SMC shaped the crossing of subject-neutral policies into mathematics, I analyze tracking policies. At RockCity, mathematics was the subject with the most tracking, currently and historically. The other core content areas (ELA, science, and social studies) had some tracking, but started later in students' K-12 experiences, with fewer opportunities for acceleration. Tracking crossed into mathematics the most because it was, as previously discussed, a longstanding structure that was uninterrogated and continually enacted by discourses about mathematics as core, defined, and sequential.

Tracking as Contested, but not in Mathematics. For the 2022-2023 school year, formalized tracking started in 6th grade where students, based on standardized test scores (MAP and *i-Ready*), grades, placement exams, and teacher recommendations, were accelerated from the grade-level 6th grade mathematics course to advanced 6th grade mathematics (see Figure 6). In later grades, there were additional opportunities for tracking, including students skipping 7th grade mathematics to go into Algebra 1 Honors, and students enrolling in “bridge classes [Algebra & Geometry Concepts and Prep for College Algebra]…to help students who are struggling to build skills to be successful at the next level” (artifact: high school registration guide 2023-2024). In the other subjects, tracking started in 8th grade, with an advanced science course and integrated ELA and social studies course.

In explaining why mathematics was the subject with the most and earliest tracking, district leaders employed a combination of discourses about mathematics as well-defined, sequential, and core. For example, the C&I director shared that:

> I think math is easier. Because, I mean, when you say advanced math, then people say things like algebra or geometry, calculus, you know, those kinds of things. Whereas ELA, what's advanced for ELA is defined by 45 different ELA people, right? You know, is it British literature? Or is it more intensive American literature? Is it composition? Is it creative writing? I mean, it's not as clearly defined. I mean, if I walked on a college campus at [RockCity] Missouri and a college campus in Rochester, New York, I'm sure their advanced literature courses look different, as defined by whoever were the people that did it….math is math is math everywhere (interview 2, 221208)

Here, the C&I director explained that it was clear how mathematical topics progress—from algebra, to geometry, to calculus. By contrast to “math is math is math everywhere,” ELA is “not as clearly defined.” What would be considered advanced ELA topics would be differently defined by different people. So, that there was a clearly defined sequence of topics distinguished mathematics from other subjects, like ELA, and rationalized more tracking in mathematics.

This clearly defined sequence of mathematical topics implicit in tracking created another sequence, or hierarchy, of students and their mathematical competence. For example, the director of AID shared that there was more tracking in mathematics:

> Because with math, you have such a sequence of learning that is more linear than it is in the other subjects. If you don't start it earlier, than you're instantly behind, if that makes sense. If you're going to complete algebra by eighth grade, you need to have completed the entirety of middle school math by the end of your seventh grade year. And if you don't start that in sixth grade, where you're getting basically a year and a half of content each year, then you're, it's very difficult to break into it at that point (interview 2, 221208).

The AID director explicitly connected the linearity of mathematics to the hierarchy of students, where students who are enrolled in the grade-level courses are “instantly behind” compared to their peers that take advanced coursework. This hierarchy, or the separation between students/tracks, was fairly stable, as “it’s very difficult to break into it at that point.”

Indeed, four district leaders explicitly acknowledged that tracking in RockCity, historically and currently, had led to segregation among students. One department director shared that about ten to twelve years ago, RockCity actually had tracking at the middle school level for all subjects, but as a result “our overall achievement had actually dropped as a district, because our achievement of our lower students had actually plummeted” (interview 2, 221213). In addition, “without a lot of careful monitoring, it can also become a have and have nots, and it becomes a way of almost having non-minority classes and minority classes….And so, it becomes almost a segregation, an unforeseen consequence.”

For these reasons, and through the district’s partnership with Equal Opportunity Schools (EOS), the district decided to dismantle tracking for all subject areas, except mathematics. According to the director of school improvement, mathematics “was the one class, back when we untracked things, it was the one class that families were incredibly vocal that they wanted to keep” (interview 2, 221213). The assistant superintendent of secondary education similarly shared that “we also have a very high university population, and we have a lot of very high motivated professors of engineering and biomedical science and mathematics and all these other things, and they push for their kids having a lot of math” (interview 2, 221209).

In recent years, there had been a resurgence of tracking in the other subjects. Up until 2021, mathematics was the only subject with tracking at the middle schools, but with the 2021-2022 school year, an integrated English and social studies course for 8th graders was created. For 2022-2023, there was also advanced science 8 and additional acceleration in mathematics—upon parent request, 6th grade students could enroll in Math 7, Advanced Math 7, or Algebra 1 (artifact: proposal for advanced core content middle School options). One C&I coordinator explained that this resurgence in tracking came from the coordinator of secondary gifted programs, as well as advocation from parents:

> the parents are always asking for more and more advanced. I struggle with that, because I think they're really asking, what they're really asking for is more

segregation. They would never say that, but I feel like there's a little bit of that undertone to it. And not everybody. I mean, some of them really do want their kids to have bigger challenges and so forth. But I think for some of them, it's more about separating types of kids” (interview 2, 221130).

Whether intentional or unintentional, segregation was an outcome of tracking, and constructed mathematics as a form of social status in the eyes of parents and community members. This function of mathematics as core perpetuated a hierarchy of students, with non-Asian students of color at the bottom.

This resurgence of tracking in other subjects worked to reinforce tracking in mathematics, to the dismay of the secondary mathematics coordinator and her department chairs. She explained that:

> I was in on a meeting because our gifted coordinator, she wrote up a proposal, put our names on it and like ‘this is what I want to see happening.’ And I was like, I feel like a hypocrite here. But I don't like this because I was the only subject that had advanced, you know, and so I didn't feel like I could speak out a whole lot, but I'm like, I don't think it's a good idea (interview 1, 220414).

For the coordinator, tracking in mathematics, and in general, conflicted with her personal discourses about school mathematics. This sentiment came up again during the department chair meetings in discussions about de-tracking in mathematics. For example, one of the middle school department chairs shared that: “I’ve been in [RockCity] for 17 years. Tracking my entire career, have never not seen it…We’ve been tracking forever and now our content areas are trying to track, and now we’re like, wait” (observation: 221011 department chair meeting). Not only did the coordinator and mathematics department chairs feel that de-tracking would receive too much resistance from district leaders and teachers—especially since there was now tracking in other subjects—but that there would also be resistance from parents and community members.

Due to these dominant social discourses advocating (or, at least, maintaining) tracking, instead of de-tracking, the mathematics department was “opening it up” and “limiting restrictions” as a way to increase access to honors courses. This included requiring parental decision-making in enrollment of honors courses (instead of teacher recommendations), as well as expanding teachers’ understanding of mathematical competence, since a perceived barrier was that “teachers [are] feeling like kids can’t do it” (observation: 221011 middle school mathematics department chair meeting). Beyond standardized measures, like those described by the director of AID (in the subject-matter context section of the findings), “indicators that a student is ready for advanced mathematics” included (artifact from 221213 middle school math department chair meeting):

- “Does the student enjoy math and/or have a genuine interest in math”
- “Does the student sometimes come up with creative solutions to problems, or use strategies that weren’t explicitly taught?”
- “Does the student have good mental math skills? Do they know their basic facts? Are they flexible in their thinking?”

Here, mathematical activity extended beyond that of procedural fluency on standardized tests, but also included mathematical practices such as problem-solving and productive dispositions in mathematics. This more inclusive frame of mathematical activity and competence challenged discourses about mathematics as well-defined, as it was less clear and agreed upon what mathematics (doing) is, and who is good at it.

Overall, tracking in mathematics was an institutionalized structure that, for at least a decade, was continually reinforced by discourses about mathematics as sequential, well-defined, and core. Mathematics as core, in particular, was enacted through parents' advocation for greater advanced opportunities, where this social status (and the hoarding of it) resulted in the segregation of students. The blending of these discourses supported tracking to cross the most into mathematics. While tracking in mathematics was uninterrogated, there had been, historically, some contestation of tracking in the other subjects. In ELA, social studies, and science, RockCity had gone from cycles of tracking to no tracking, back to tracking. This current resurgence of tracking in the other school subjects created resistance for the secondary mathematics coordinator and her department chairs, where ingrained social discourses related to tracking conflicted and overpowered their personal discourses.

Mechanism 4: Subject-Matter Context Maintained Non-Crossing of Policies into Mathematics

At RockCity, policies directly related to issues of curriculum and instruction (e.g., standards-referenced grading; tracking) oftentimes crossed into specific content areas, because content coordinators facilitated subject-specific implementation. In mathematics, one exception was efforts to support place-based learning. District leaders explained that there were several place-based learning opportunities in science and social studies, but few in mathematics, and this was related to the epistemology of mathematics. For example, the secondary mathematics coordinator explained that:

> our curriculum was so linear, you know. Something cool in the media might come up that maybe has a statistical bent, but the stats unit was one, and they're already past it. Teachers are reluctant to maybe do that lesson now because they got other stuff they got to do, you know. So, whereas I feel on the other subjects, maybe they aren't as linear, so they can somehow tie it into what they're currently learning (interview 2, 221130).

Because mathematics was understood to be inherently linear, in part reinforced by the need for content coverage ("they're already past it…they got other stuff they got to do") due to state accountability, it was challenging for teachers to create place-based opportunities. By contrast, other subjects are less linear, so it was easier to connect contemporary topics to the current learning standards. Similarly, the elementary mathematics coordinator shared that:

> It's easier to implement, like, if you are doing science things and you're doing life science, you can go out in your playground or out in your outdoor classroom and do those things. Social Studies, they do the African American Heritage Trail, like things like that. It just connects easier. A lot of times I think, in math and ELA, we're so focused on- we're working on addition, right? That we're not thinking necessarily about within your place (interview 2, 221201).

The content of other subject areas "connects easier" to nature and community places, whereas mathematical doing is "working on addition." Overall, discourses about mathematics as sequential and mathematical learning narrowly defined as doing problems inside the classroom were incompatible with efforts to support place-based learning, so these efforts rarely crossed into the mathematics boundary.

In addition, policies that only *indirectly* affect classroom teaching and learning (e.g., attendance, behavior, equity efforts) remained subject-neutral, never crossing into the "instruction" boundary nor the boundaries of mathematics education. For example, behavior challenges and solutions were often framed as outside the purview of instruction and curriculum. One important solution was the new behavior education plan, which included recommendations for building relationships and supporting positive behavior, as well as a discipline matrix that outlined the consequences for given actions. The equity department was responsible for facilitating the drafting of the behavior education plan, and involved collaborating with other stakeholder groups. According to the chief equity officer, this primarily included principals and assistant principals (because they were the ones in charge of discipline), as well as the director of safety, student behavior and support staff, the IEP team, and the special services department. This, however, did not include C&I coordinators because, according to the assistant superintendent of secondary education, "I don't know if they have that background knowledge to do that" (interview 2, 221209). That mathematics-specific district leaders were not involved in these policy discussions demonstrates how there was no physical crossing of individuals between groups (principals; C&I staff), and therefore, no symbolic crossing of behavior policies into the mathematics boundary. In part, the mathematics SMC facilitated the persistence of behavior as a subject-neutral policy, as there were no dominant discourses related to mathematics pedagogy that attended to behavior. For example, at the instructional mentor and coaches' mathematics professional development, there were often conversations regarding behavior challenges and the need to address those before (mathematics) learning can occur, rather than as an integrated element of instruction.

In general, the mathematics SMC at RockCity supported the persistence of subject-neutral policies. To illustrate these mechanisms, in what follows, I analyze equity efforts at RockCity. After discussing the ways in which equity was framed as subject-neutral, I then reflect on how the non-crossing of equity was maintained by the mathematics SMC.

Equity. At RockCity, the equity department's role was to address disproportionalities in behavior, attendance, and achievement. This was explained by the chief equity officer:

> The primary purpose for which the role was created was to look at those areas in our district that were typically overrepresented, behavior wise, and disciplinary issue wise and achievement wise, by our underrepresented populations right…So our big rocks were to get them to school. So attendance. To keep them in school, which was the behavior pieces. So for what reasons were students not being able to stay in class. And then to get them caught up and move them, and so that was the academic piece. And so they really just all tied together, because if you're not here, you can't learn right (interview 1, 220815).

Here, the chief equity officer referenced the district's continuous 2018-2022 improvement plan, using the same language as the three success indicators of goal one ("get them to school;" "keep them in class;" "catch them up") to explain the department's focus on disproportionalities in attendance, behavior, and achievement, specifically for the district's underrepresented student populations. This served to frame the boundaries for equity challenges as defined by those three criteria: attendance, behavior, achievement. Other problems and solutions that did not meet these criteria fell outside the equity boundary. So, equity crossed into mathematics only in terms of achievement, since, as previously described, interdiscursivity with accountability discourses constructed equity as equal achievement across student populations, specifically for the core subjects of mathematics and ELA. Moreover, issues of behavior and attendance were perceived to only *indirectly* affect student learning, so they were subject-neutral and did not cross into any specific content area.

To address these equity challenges, the district facilitated district-wide equity and restorative practices (RP) professional development to support individuals' learning about cultural competence and issues of identity, privilege, and oppression. According to district leaders, these trainings were subject-neutral, as it was the same training for everyone, regardless of position, content area, or grade level. The chief equity officer also framed equity training as falling outside the content areas: "our teachers will go to training on their core subjects and spend time with their academic coaches, but equally as important is understanding the why and the how….You have to have that equity and restorative practices underpinning all of the other work" (interview 1, 220815). In naming two types of trainings—content area and equity/RP—the equity officer established the two as separate, which served to harden boundaries between equity and "all of the other work" (i.e., content areas). Similarly, the secondary mathematics coordinator explained that "there's been a lot of training of behaviors and routines for school, which has been a struggle, because teachers have had to do that, along with trying to teach content" (interview 1, 220414). Like the equity officer, she named the two efforts (behavior trainings and teaching content) as different.

Beyond challenges related to behavior, achievement, and attendance, the chief equity officer saw that "equity just has its hands in everything…you can't be equitable like in this space and not over here" (interview 1, 220815). For example, the equity officer described working with the transportation office to increase access for students with physical disabilities. Similarly, the director of school improvement explained that equity is "a lens that we are looking at everything we do…equity kind of permeates it all" (interview 2, 221213). Generally, that equity was dominant and informed all the district's efforts is represented in Figure 9 with the outermost boundary labeled as "equity/work of the district."

Though not within its organizational boundaries, the equity department framed the work of curriculum and instruction as supporting equity. According to the equity department website, the RockCity Curriculum and Instruction (C&I) Department:

- "strives to provide diverse curricula inclusive of stories, history, and characters from various backgrounds"
- "participated in a department-wide book study, *Opening Doors: An Implementation Template for Cultural Proficiency*…to articulate a shared understanding of equity in curricula and instruction"
- collaborated with social studies and English education faculty from the local university and expanded partnerships with AVID to perform "a deep dive into our instructional practices and how best we can continue to develop equity in our curricula and instructional practices."

Here, the crossing of equity into C&I was primarily in terms of inclusive curriculum and equitable instructional practices. This tended to be subject-neutral, but when subjects were specifically targeted, it was ELA and social studies, not mathematics.

The blurring of equity and C&I appeared to be resonant outside of the equity department as well. For example, the assistant superintendent of secondary education positioned equity as falling within C&I, as she framed one of her three goals as specifically for equity:

> So [the superintendent] wanted an equity goal from [the assistant superintendent of elementary education] and I, and for all schools, so that's this [goal two]. And then the things that are important are intervention [goal 1] and our standards referenced grading [goal 3], we had to include here, so they have to be around. I wanted to, at least two [goals] to be around teaching and instruction and kids and success and achievement and assessment (interview 1, 220520).

Here, the assistant superintendent engaged in some very explicit boundary framing. The second goal—"the teacher establishes secure teacher-student relationships" (artifact: secondary assistant superintendent 2021-2022 goals) which "is about equity trainings and using the behavior matrix" (interview)—was explicitly about equity, but the other two goals focused on SRG and intervention in ELA and mathematics were not. Moreover, by framing the latter two goals as "around teaching and instruction," she implicitly positioned the equity goal as not about teaching and instruction. Her framing of the teacher-student relationship goal blurred equity and behavior, and was consistent with the equity department's framing. Simultaneously, however, she hardened the boundary between equity and C&I by framing SRG as not about equity. The framing of SRG as falling outside equity was also present in official SRG policy text. Besides the district equity statement at the top, there was no mention of equity in the SRG practices handbook, nor in parent communication about SRG. This suggests that the frame of SRG as being about equity was not resonant across the district.

Overall, equity occasionally crossed into the boundaries of C&I, though primarily in subject-neutral forms, like through SRG policies or “access” to high-quality curriculum. As described earlier, the boundary between equity and content areas was bright, where there was no explicit attention to thinking about what equity would look like in the content areas, besides the generic achievement challenge in mathematics and ELA. Specifically, the equity and restorative practices training were not being enacted in subject-specific ways. Equity trainings supported teachers’ learning about issues of cultural competence and identity, and informed their interactions with students and discipline practices, but, according to the elementary mathematics coordinator, “I don't think there's ever an intentional connection to a subject” (interview 2, 221201). Likewise, the director of school improvement shared that “equity is on the outside [of the “instruction” boundary], not inside that, because it's not specific, and the coordinators aren't really tasked with it” (interview 2, 221213).

Equity crossed into mathematics only in terms of achievement (gaps). Equity in terms of identity, like through the equity and restorative practices professional development, was not being enacted in subject-specific ways in mathematics. As described in the mathematics SMC section, I refer to *identity*-related equity issues as those that attend to the ways people’s intersectional identities shape their experiences, and how privilege and oppression operate in schools and society. The mathematics SMC maintained this non-crossing as there was a lack of mathematics-specific discourses to support a mathematics-specific form.

That is, the mathematics SMC at RockCity was not characterized by discourses that would support identity-related equity issues to cross into mathematics. This first requires understanding what identity-related equity in mathematics might look like. An understanding of cultural competence and issues of identity, privilege, and oppression in mathematics might include teachers acknowledging students' multiple identities, and leveraging those resources (Civil, 2007) to support mathematical investigations into social and political topics important to students (Frankenstein, 1990). Moreover, teachers (and students) might examine how students' intersectional identities shape their experiences, especially through the ways power and oppression operate in their lives, including in the mathematics classroom, school, and district (Bullock, 2018). Underlying this would be discourses about mathematical activity as identity work, extending far beyond procedures and computations to also include the sensemaking and changing of one's experiences and lives through mathematics (Gutiérrez, 2012). This might include recognizing how students from underrepresented populations have historically been marginalized in mathematics, and that this continues through differential access to status and learning opportunities (Flores, 2007).

As described earlier, discourses about mathematics pedagogy, those related to identity or otherwise, were infrequently employed by district leaders and did not penetrate district policymaking, outside of that of the mathematics coordinators. And among the mathematics coordinators, identity was marginally attended to, only with respect to supporting students' mathematical identities, underrepresented students' achievement—in standardized test scores or course-taking patterns—and some consideration of cultural relevance in mathematics curriculum materials (observation: 230113 *Illustrative Mathematics* decision meeting). As such, mathematics teaching and learning was not widely understood to be about using mathematics to make sense of (or critique) oneself, others, and the world. This suggests that, at RockCity, the mathematics SMC encompassed few mathematics-specific discourses that would have supported identity-related equity efforts to cross into mathematics. Without such discourses, equity and restorative practices PD (focused on identity) stayed outside the boundaries of mathematics.

However, equity in terms of identity did occasionally cross into social studies. For example, the social studies department engaged students in the African American Heritage Walk "to learn more about the significant achievements and contributions made by the people and institutions in [RockCity's] Black community" (artifact: social studies website). That equity mostly crossed into social studies was expressed by three district leaders, and explicitly positioned so on the equity department website, as the only subject to receive a dedicated tab was social studies, through a focus on "African American History in our school curriculum" (see Figure 11).

These equity efforts, however, were not as integrated into the other subjects, like mathematics. For the chief equity officer, this was because:

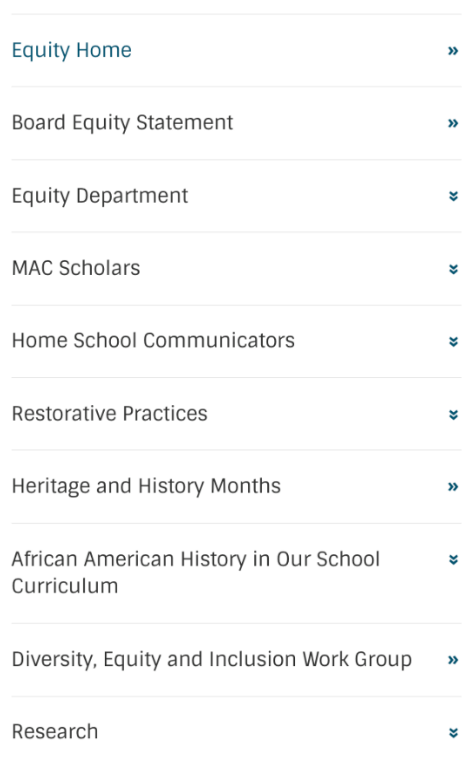
> I really feel like there's so much of the social justice pieces that pop up that it's a natural fit for social studies and those conversations that happen authentically in a space like that… you're going to have conversations about ancient civilizations and current civilizations and topics about what's going on right now in society,

right. So you're going to talk about maybe a George Floyd or Supreme Court ruling or some of those things.

Here, the equity officer's talk enacted discourses about social studies as being inherently culturally relevant, and therefore compatible with discussions about issues of identity. By focusing on social studies in particular, this frame ignored other subject areas and diverted attention away from the ways in which they may be culturally relevant. In mathematics, the mathematics coordinators' quotes earlier (on p. 223) suggest that the sequentiality of mathematics, its related need for content coverage, and mathematical activity as doing problems inside the classroom were barriers to developing and implementing culturally relevant curriculum.

Figure 11

Tabs on RockCity's Equity Department Website



The framing of social studies as inherently culturally relevant was compatible with the social studies department's goals, which was to prepare students to: be "responsible citizen[s]" in their community; "appreciate the cultural heritage and diversity" of the U.S. and the world; and understand economic, social, and political systems (artifact: social studies website). It is important to note the absence of accountability discourses in the social studies department's goals, which stands in contrast to that of the mathematics department's, whose "focus is on student achievement" through: developing understanding of mathematics; "vertical alignment of learning objectives" and instruction; and through the "purposeful use of assessment data" (artifact: mathematics department website). Unlike social studies, the mathematics department did not employ any discourses about cultural relevance or other issues of equity, and instead enacted discourses about achievement, standardization, and assessment. These discourses aligned well with the district's equity challenges related to disproportionalities, especially those related to achievement in mathematics. They were also compatible with the mathematics coordinators' equity efforts, which, as described earlier, focused on access and achievement: supporting access to advanced mathematics coursework, and inquiry-based instruction, which supports students' positive mathematical identities and is more effective for students of color.

The elementary mathematics coordinator helped to explain why identity-related equity issues did not cross into mathematics, sharing that the equity trainings were about:

> helping you see the inequities in our world, right. And your privilege and your understanding other people's privileges. Like very global….Within mathematics, the equity isn't necessarily about, it doesn't have to be about privilege. Like,

> within mathematics, people can have a negative attitude about their mathematics and still be a very privileged person, right, in other ways. But we also know that there is definitely a gap in mathematics and people of color (interview 2, 221201).

Here, the coordinator contrasted between equity trainings—supporting individuals' learning about privilege—and equity in mathematics—positive attitudes and identities towards mathematics, as well as the achievement gap. This suggests that there was little crossing between equity in mathematics—as originating from the mathematics coordinators—and the equity department's focus on issues of identity, as reflected in the equity and RP trainings.

Further, in stating that "people can have a negative attitude about their mathematics and still be a very privileged person," attention was deflected away from the systemic ways in which students from advantaged groups were afforded differential access to (mathematical) learning opportunities in schools. For example, tracking in mathematics was institutionalized in RockCity (even despite the mathematics' coordinators efforts to expand access), and functioned as a mechanism for segregation, in mathematics and in other subjects as, per the secondary mathematics coordinator, "the other subjects who have a heterogeneous mix, really don't. Because the hours there's advanced math, those kids are pulled out" (interview 2, 221130). So, despite the equity training's focus on supporting individual's learning about privilege and the ways it is maintained in society, there was no interrogation of such inequitable structures specifically in mathematics. Instead, equity in mathematics was confined to classroom-level challenges and changes.

Overall, at RockCity, efforts from the equity department addressed challenges related to disparities in access and achievement, through identity-related solutions—learning about cultural competence, identity, and privilege through equity and restorative practices trainings. While the achievement (gap) challenge did cross specifically into mathematics and ELA, as this was compatible with the mathematics coordinators' equity efforts focused on supporting access to inquiry-based instruction and advanced mathematics, the equity and RP trainings were subject-neutral and did not penetrate any specific content area. The mathematics SMC maintained this boundary, as there were dominant equity discourses in mathematics focused on access and achievement, but not identity and power. As such, there were few mathematics-specific discourses to support or legitimize the crossing of identity-focused efforts from the equity department (e.g., equity & RP PD) into mathematics. By contrast, there was a blurry boundary between social studies and equity, and this was attributable to the presence of identity-related discourses in that subject.

Summary

At RockCity, the mathematics SMC shaped boundary framing through four mechanisms. First, with respect to top-down policies authorized by the cabinet, the SMC made available dominant accountability discourses and discourses about mathematics as core that defined achievement as a criterion for mathematics and ELA-differentiating policies, like tutoring, instructional coaching, and intervention. Moreover, mathematics-as-sequential discourses were influential and legitimized mathematics as the target of assessment and intervention structures. While discourses about mathematics pedagogy were fairly absent in the first mechanism, they were more influential in the second mechanism, where middle leaders' personal discourses interacted with dominant social discourses from the SMC to shape policy enactment. The enactment of mathematics intervention, in particular, was negotiated between various departments—C&I and AID—where discourses focused on conceptual understanding aligned with discourses about the sequentiality of mathematics, and together were powerful in defining mathematics intervention. In the third mechanism, the SMC supported the crossing of subject-neutral policies into the mathematics boundary. For example, tracking operated the most in mathematics, because it had a special social status, and discourses about mathematics as defined and sequential made visible which students were "good" at mathematics. Moreover, recent efforts to increase tracking in the other subjects reinforced tracking in mathematics, and overpowered the mathematics' personal discourses and efforts to de-track. Other subject-neutral policies (e.g., equity in terms of identity) never crossed into mathematics, which was in part maintained by the SMC—the fourth mechanism.

CHAPTER 6: DISCUSSION AND IMPLICATIONS

This study was motivated by an overarching concern that the field's pursuit of its vision of ambitious and equitable mathematics education is mostly confined to addressing issues related to teaching and learning within the four walls of the classroom (Pais & Valero, 2012). Instead, viewing mathematics education reform as a problem of not only teacher learning but also organizational change—where the institutional settings teachers work are organized to support teacher and student learning (Cobb & Smith, 2008)—my investigation focused on district policymaking for mathematics education, specifically, the *boundaries* that districts frame to define and distinguish policies for mathematics education from other educational policies. Whereas educational policy research typically takes a subject-neutral perspective (Burch & Spillane, 2003; 2005), without an explicit position on what counts as equitable and high-quality mathematics education (Cobb & Jackson, 2011), I examined how the *subject-matter context* provided subject-specific meanings (i.e., discourses) that district leaders draw upon in making sense of and enacting policy. My findings reveal the specific mechanisms through which discourses about the subject entered boundary framing, and, by comparing two cases, my study accounts for the ways in which differences in subject-matter context, organizational structure, and local context shaped boundaries for mathematics education policy.

In this final chapter, I discuss the similarities and differences described in Chapters 4 and 5, and, by drawing connections to the literature reviewed in Chapter 2, I consider how and why these patterns occurred (Miles et al., 2014; Yin, 2015). This discussion of cross-case findings includes two sections. After first comparing the districts' mathematics subject-matter contexts (research question 1), I examine the role of the subject-matter context on boundary framing (research question 3) to explain similarities and differences across the districts' boundaries around policy for mathematics education (research question 2). Finally, after discussing the limitations of my research, I consider implications for researchers and K-12 school districts.

Districts' Mathematics Subject-Matter Contexts

To attend to the nuances across each district's SMC, this study asked: *What discourses about school mathematics construct the mathematics subject-matter context in school districts?* An overview of these discourses is provided in Table 5, where italicized text represents differences across districts. Because Table 5 is necessarily detailed, in the following sections, I offer conjectures for what might account for those differences and similarities. Moreover, I discuss insights from my study with respect to the *dominance* of discourses, and the implications they have for policy enactment and boundary framing.

Explaining Differences and Similarities in Mathematics Subject-Matter Contexts

As indicated in Table 5, RiverTown and RockCity's mathematics SMCs differed primarily in relation to discourses about equity and mathematics pedagogy. In both districts, these discourses were *contested*, where there were competing definitions and perspectives on the role of equity in schooling, and what high-quality mathematics instruction looks like. However, the nature and sources of these discourses differed.

With respect to pedagogy, RiverTown district leaders rarely attended to issues of high-quality mathematics instruction. The exception was with respect to the newly adopted *Eureka Math*, which encoded discourses focused on the importance of learning multiple solution strategies, and competed with discourses focused on recall and procedures that were reflected in teachers' instruction and social discourses that leaders

Table 5

Overview of Discourses that Characterize Districts' Mathematics SMC

Discourses	**RiverTown**	**RockCity**
Mathematics as core	• Mathematics is tested, and mathematical skills are useful and applicable to other contexts (science learning and life) • Explicitly stated in district policy texts (e.g., CSIP), expressed through district leaders' personal discourses, reflected in greater allocation of resources (e.g., instructional time, intervention) for mathematics, and valued by community	• Mathematics is tested, and mathematical skills are useful and applicable to other contexts (science learning and life) • Explicitly stated in district policy texts (e.g., CSIP), expressed through leaders' personal discourses, and reflected in greater allocation of resources (e.g., instructional time, intervention office) for mathematics, and valued by community
Mathematics as sequential and well-defined	• Two sequences: specific order mathematical content needs to be mastered; hierarchy of students and their competence • Mathematics is objective, with only one answer • Mathematical doing and competence defined by state and local standardized assessments • Enacted in formal structures (e.g., tracking; intervention) • Expressed through district leaders' personal discourses	• Two sequences: specific order mathematical content needs to be mastered; hierarchy of students and their competence • Mathematics is objective, with only one answer • Mathematical doing and competence defined by state and local standardized assessments • Enacted in formal structures (e.g., tracking; intervention) • Expressed through district leaders' personal discourses, *though occasionally contested by mathematics-specific leaders*
Mathematics pedagogy	• *Importance of learning multiple solution strategies encoded in newly adopted curricular materials (Eureka Math)* • *Focus on recall and procedures reflected in teachers' instruction and social discourses from teachers and families* • Infrequently expressed by district leaders	• *Dialogic instruction promoted by mathematics-specific leaders, through curriculum and professional development* • *Direct instruction enacted in intervention, and expressed in social discourses from community* • Infrequently expressed by *other* district leaders
Equity	• *Equity controversial and undesired by community* • *Access and meeting (poor) students' (academic, physical, social-emotional) needs expressed through district leaders' personal discourses* • *Meeting students' mathematical needs enacted in efforts and routines (e.g., tutoring; intervention)* • *No attention to inequitable outcomes or structures*	• *Important to district, as reflected in presence of equity office* • *Explicitly stated in district policy texts (e.g., equity statement)* • *Solutions (e.g., equity and RP training) enacted identity-related discourses, while problems related to disparities focused on access and achievement* • *Dialogic instruction is equitable, as it supports achievement and positive math identities, especially those of students of color*
Accountability	• Explicitly stated in policy texts (e.g., CSIP), expressed through district leaders' personal discourses, and enacted in routines (e.g., intervention, data-based decision making) • Functioned to: reinforce mathematics-as-core; construct sequences in which learning and students progress; narrowly define mathematical activity and competence; and *constrain equity and need-meeting to achievement*	• Explicitly stated in policy texts (e.g., CSIP), expressed through district leaders' personal discourses, and enacted in routines (e.g., intervention, data-based decision making) • Functioned to: reinforce mathematics-as-core; construct sequences in which learning and students progress; narrowly define mathematical activity and competence; and *construct equity as equal achievement across student groups*

Note. Italicized text refers to differences across districts reported hearing from RiverTown teachers and families. There were also competing discourses at RockCity, between traditional, direct, which was enacted through interventions from the AID office and community members, and inquiry-based instruction, which was promoted by the mathematics-specific leaders' personal discourses and efforts (including curricular adoptions *of Illustrative Mathematics*). These latter discourses, however, rarely penetrated the talk or policymaking of other RockCity district leaders. To be clear, while both districts had competing discourses related to mathematics pedagogy, the sources of those competing discourses differed. In RockCity, there were differences among district leaders (and central office departments); in RiverTown, the differences were between new curricular materials and teachers' instruction—and not necessarily among district leaders.

Equity discourses also differed between the two districts. While "equity" was, in general, frowned upon by the RiverTown community, and therefore not explicitly taken up by RiverTown leaders, equity was important to and very visible at RockCity (e.g., there was an entire equity department). There was still, however, some pushback against equity efforts, from RockCity staff as well as community members. Both districts attended to issues of access and achievement, which, at RiverTown, took on the form of "meeting students' needs." This focus on access and achievement penetrated mathematics, where RiverTown focused on addressing students' mathematical needs and RockCity focused on the achievement gap—as represented in cabinet and district policy texts—as well as access to inquiry-based instruction—as suggested by personal discourses of the mathematics-specific leaders. Here, intersection with accountability discourses constrained RiverTown's "need-meeting" to achievement concerns, and

RockCity's attention to equity to equal access and achievement across student groups. In addition to achievement concerns, RockCity also attended to issues of identity through their equity and restorative practices professional development, focusing on cultural competence, privilege, and oppression. These efforts, and the discourses they enacted, were primarily restricted to the workings of the equity department, with little penetration into RockCity's other departments.

Two reasons account for these differences across RiverTown and RockCity. The first pertains to differences in the districts' organizational structures. At RockCity, vertical (hierarchical) and horizontal (departments) segmentation allowed for specialization and distribution of responsibilities, but also constrained communication, where different priorities among different groups of people sometimes resulted in competing demands, and therefore competing discourses. For example, mathematics pedagogy as enacted by the AID office aligned more with direct instruction, while mathematics pedagogy promoted by the C&I department was more constructivist and inquiry-based. Likewise, RockCity had an entire equity department that promoted identity-related equity discourses through equity trainings, which differed significantly from the access and achievement discourses from the mathematics coordinators, and the district's larger focus on achievement gaps. This aligns with previous research on the non-monolithic nature of district policymaking (Spillane, 1998), where districts have different perspectives on high-quality education (Coburn et al., 2009).

This, however, was less the case at RiverTown, where the district leadership team was significantly smaller, and more internally homogenous. Moreover, RiverTown had no district leaders explicitly charged with supporting mathematics, or equity. So, the mathematics SMC at RiverTown was more "stable," in that there was more consistency between district leaders' personal discourses and social discourses as reflected in people, policies, and structures. These findings suggest that, though the SMC is continuously negotiated, the extent to which there is contestation *or* stability of discourses is related to the segmentation of the district's organizational structure. This implication was highlighted by comparing small, rural RiverTown to larger micropolitan RockCity, which adds to the literature on district policymaking that has primarily focused on large suburban and urban districts.

These discourses circulating within each district, however, still competed with external discourses from the community. This is a second potential explanation, where differences in local community contexts contributed to differences in SMCs. This was more the case with equity discourses than pedagogy-related discourses. First, as alluded to earlier, equity was significantly more controversial in RiverTown, so the palatable framing of equity was "meeting students' needs." As described in Chapter 4, the focus on students' needs seemed to originate from the community's economic history and loss of business, which resulted in a significant increase of students qualifying for free- and reduced-price lunch. On the other hand, RockCity's community and staff seemed to be more supportive of equity efforts. This may, to some extent, reflect the different political contexts of these two communities, but it is also likely due to RockCity's involvement in equity work over the last decade. There was also significantly more attention to issues of identity and oppression, including racism, at RockCity—possibly due, in part, to the significantly greater racial diversity in its student population. So, reflective of the student populations the districts served, RiverTown was primarily concerned with the *needs* of their poor students, while RockCity was also focused on their students of color, especially their Black students, and the ways in which students' experiences in the school district were related to their intersecting *identities*.

That RiverTown and RockCity had different and various understandings of equity—ranging from dominant issues of access and achievement, to the more critical dimension of identity (Gutiérrez, 2012)—likely reflects the ongoing debates and conversations in the field, and society writ large, about these issues. Pedagogical debates also operated in both districts, in part, emanating from the community. This was most obvious in RockCity, where district leaders explicitly discussed how the "math wars" between "new" and "traditional" mathematics from the late 2000s still continues today. This suggests that broader societal debates about education penetrate schools and districts, which are reflected in districts' SMCs through *contested* discourses about equity and mathematics pedagogy.

By contrast, discourses about mathematics as core, sequential, and defined, and interdiscursivity with accountability discourses, were quite *dominant* in both districts. In particular, accountability pressures were overwhelming—in large part due to lower than state average scores on the annual standardized test—so such discourses penetrated the mathematics SMC. This is likely unsurprising, given the presence of high-stakes testing in U.S. schooling the past couple decades. On the other hand, that mathematics-as-core, sequential, and defined discourses spanned both districts' SMCs suggests broader cultural influences about the subject, potentially stemming from the parent discipline and the history of U.S. schooling. Of course, these mathematics-specific discourses are currently reinforced by accountability discourses, but mathematics has always been a "core" school subject (Garret & Davis, 2003), long before being the target of accountability policies. Outside of testing, mathematics is viewed as supporting the development of “mental discipline” (Stanic, 1987), which was reflected in RiverTown and RockCity through discourses about the usefulness and application of mathematics to other contexts, from college to “life” more generally. Likewise, since the turn of the of the 20th century, the U.S. high school mathematics curriculum had been primarily defined as a set of linear courses progressing through algebra, geometry, then trigonometry (Kliebard & Franklin, 2003). With increasing calls for more practical mathematics, the curriculum was bifurcated between “sequential” mathematics—"the traditional curriculum of algebra, geometry, and trigonometry…reserved for the highest ‘technically trained men and women’” (Garret & Davis, 2003, p. 510)—and a more “related” and “social” mathematics for other students. In RiverTown and RockCity, this sequence of mathematical content still holds, as well as the tracking of students.

These similarities (accountability, mathematics-as-core, sequential, and defined) and differences (pedagogy, equity) across RiverTown and RockCity’s mathematics SMCs suggest that some discourses might be more context-specific than others. That is, districts’ mathematics SMC might have greater variation regarding discourses about pedagogy and equity, compared to discourses about accountability and mathematics as core, defined, and sequential. Based on my two cases, the latter discourses seem to be more stable and dominant within a district’s SMC, and potentially across districts. With a long and established presence in U.S. schooling, discourses about mathematics as core, sequential, and defined are likely to be more dominant across other districts, regardless of size or community context. I elaborate on these issues of discourse dominance next.

Discourse Dominance

At both RiverTown and RockCity, the mathematics SMC was characterized by a variety of discourses that differed with respect to source and dominance. As described earlier, while discourses about equity and mathematics pedagogy were *contested*, discourses about mathematics as core, sequential, and defined were *dominant*. These latter discourses, however, differed in the ways in which they were dominant, which were related to their sources. While discourses about mathematics as core were explicit and visible in the ways they reproduced and were enacted in policymaking, discourses about mathematics as defined and sequential were implicit, hidden within institutionalized structures (e.g., tracking, intervention).

Mathematics-as-core discourses were widespread and emanated from a variety of sources, including: district policy texts and artifacts (e.g., CSIP); state and federal accountability policies; the allocation of resources; the discipline of mathematics ("mental discipline"); individuals' personal discourses, including that of external actors like families and community members; and the organizational structure of the district (as was the case with the AID office at RockCity). Not only did these discourses reproduce at all levels (classrooms, schools, districts), within and outside (with community members) the district, they also emanated from state and federal accountability policies that included mechanisms for enforcement.

By contrast, discourses about mathematics as sequential and defined were more implicit, since they were not written in policy texts. They were, however, expressed by most district leaders across both districts, as well as enacted in formalized structures (e.g., tracking and intervention systems). So, these discourses were still dominant, in that understandings about mathematics as linear and agreed upon were implicitly understood by most district leaders, and enacted in and reproduced through institutionalized structures. Unlike mathematics-as-core discourses that were hegemonic, at RockCity, the mathematics-specific leaders did occasionally contest mathematics-as-sequential and defined discourses, through their efforts to move away from ability grouping and tracking and to expand notions of mathematical competence.

These differences in discourse *dominance* matters for how the SMC was individually interpreted, and therefore how the SMC shaped boundary framing. I address the latter in the following section, but here, I briefly reflect on the former with respect to two points. The first addresses implications with respect to the different ways mathematics-as-core, sequential, and defined discourses were dominant; the second addresses the implications that arise from differences between dominant and contested discourses.

First, given that mathematics-as-core discourses were explicit, visible, and widespread, with enforcement mechanisms from accountability discourses, there was likely little room for contestation from local actors. In other words, because everyone agreed on the importance of mathematics and performance on standardized assessments, the overwhelming accountability pressure likely constrained policymakers' attention to such myopic concerns. On the other hand, that discourses about mathematics as sequential and defined were implicit, but enacted in institutionalized structures (e.g., tracking, intervention), suggests that they operated in more invisible ways. That is, these dominant discourses were likely influencing district policymaking and practice without leaders' explicit knowledge.

Second, it is likely that there was greater interpretative range for the contested discourses than the more dominant discourses. Compared to how almost, if not all, district leaders interpreted accountability pressures, and agreed that mathematics is core, defined, and sequential, there were different interpretations of the district's vision (or lack thereof) regarding equity and high-quality mathematics pedagogy. Moreover, especially in RockCity, individuals' personal discourses about equity and mathematics pedagogy were sometimes incompatible with social discourses. This suggests that how the SMC shaped boundary framing with respect to the dominant discourses was likely more similar across individuals and policies, than how the SMC shaped boundary framing through the contested discourses. This is because the SMC provides discourses that actors draw on in making sense of and enacting policy, so how the SMC shaped boundary framing was mediated by who was making and enacting policy (and how they interpret contested discourses in relation to their personal discourses). I return to these ideas in the following section, where I discuss interactions between the mathematics SMC and boundary framing.

Interactions between Mathematics Subject-Matter Context and Policy Boundaries

In this section, I synthesize cross-case findings for the second and third research questions. Specifically, I consider how answers to the third research question—*How are boundary framings shaped by the mathematics subject-matter context?*—might explain similarities and differences between cases for the second research question—*In what ways are the boundaries around policy for mathematics education framed in school districts?*

As a reminder, in analyzing for policy boundaries, I employed Grossman and colleagues' (2004) framework for interpreting the ways in which policymakers establish relations between policy and the subject matter. This helped me to categorize policies as mathematics-specific, mathematics-differentiating, or subject-neutral, which then allowed me to consider the conceptual distinctions—or boundaries—between these policy types. As described in Chapters 4 and 5, I found three total policy boundaries operating in each district: boundaries around policy for mathematics education; boundaries around "instruction"; and boundaries defining the work of the district. Table 6 provides an overview of each district's policies in relation to these boundaries. In both districts, policies sometimes crossed into specific subjects, when some subjects were prioritized or there was work supporting subject-specific implementation. This crossing is represented in Table 6 by the color coding of the efforts: pink for prioritization in mathematics and ELA, orange for prioritization in other subjects, and green for subject-specific implementation in all the core content areas.

To understand how these boundaries were framed, I considered themes and differences in boundary framing mechanisms. And, because organizational structure mediated the negotiation of the mathematics SMC, I attended to the role of organizational differences in interactions between SMC and the boundaries around policy for mathematics education. As described in Chapters 4 and 5, there were three mechanisms across both districts through which the mathematics SMC shaped boundary framing: 1) SMC constructed achievement as the criterion for mathematics-specific and differentiating policies; 2) SMC facilitated crossing of subject-neutral "instruction" policies into mathematics; and 3) SMC maintained the non-crossing of subject-neutral policies. The fourth mechanism was present only in RockCity: 4) the SMC was negotiated by middle leaders in their policy enactments, for both subject-differentiating policies authorized by the cabinet, as well as mathematics-specific policies they independently pursued.

Table 6

Overview of District Policies and Their Relation to Different Boundaries

Boundary	RiverTown Policies	RockCity Policies
Boundary around policies for mathematics	• New curriculum	• Inquiry-based instruction • Diversity in mathematics
Intersection of mathematics- & ELA-specific boundaries	• Achievement • Intervention • Tutoring	• Achievement • Intervention & progress monitoring • Instructional mentors
"Instruction" boundary	• Instructional coaching • **Rigor** • **Standards-based grading** • **STEM** • **Tracking**	• **AVID & EOS** • **Place-based learning** • **Standards-referenced grading** • **"Tier One" Instruction** • **Tracking** • **Tutoring**
Outside "instruction" boundary	• Attendance • Behavior • Building leadership teams • Student well-being & mental health • Sense of belonging • Teacher morale • Staff recruitment & retention	• Attendance • Behavior • Disproportionate disparities • Student and staff mental health • Equity & Restorative Practices PD • Staff recruitment & retention

Note. Subject-neutral policies in color refer to those that cross into specific subjects: **mathematics and ELA**; **other subjects**; or **all subjects**.

Table 7 summarizes these four mechanisms, highlighting the discourses that were most powerful in shaping policy enactment for that mechanism. In the following sub-sections, I consider how similarities and differences in these mechanisms explain

Table 7

Overview of Discourses and Mechanisms Through Which Mathematics SMC Shaped Boundary Framing

Boundary	Mechanisms	RiverTown	RockCity
Boundary around policies for mathematics	1. SMC constructed achievement as criterion for mathematics-specific and differentiating policies	• **Social discourses about accountability, student needs, and mathematics as core** constructed the problem of "gaps" and "needs" in achievement • Curricular materials, tutoring, and intervention were solutions that addressed student needs in achievement • Leaders' **personal discourses about mathematics as sequential and defined** helped to legitimize mathematics as target for intervention at the high school, but not the middle school	• **Social discourses about accountability and mathematics as core** constructed achievement as problematic • Tutoring, instructional coaching, and intervention were solutions that addressed mathematics achievement • **Personal discourses about mathematics as sequential** helped to legitimize mathematics as target for intervention
	4. SMC negotiated by middle leaders in enacting policies	n/a	• Intervention was negotiated between C&I and AID, where **personal discourses about conceptual understanding in pedagogy** aligned with **social discourses about mathematics as sequential** • **Personal discourses about pedagogy** and **access and achievement** in mathematics were compatible with **social discourses related to achievement gap**
"Instruction" boundary	2. SMC facilitated crossing of subject-neutral instruction policies into mathematics	• **Social discourses about mathematics as core (including social status), sequential, and defined** prioritized mathematics for tracking and policies to support rigor	• **Social discourses about mathematics as core (including social status), sequential, and defined** prioritized mathematics for tracking, but delegitimized place-based learning • Social discourses promoting tracking in other subjects overpowered **personal discourses about de-tracking** in mathematics
Outside "instruction" boundary	3. SMC maintained non-crossing of policies	• **No available pedagogy discourses** to support sense of belonging to cross into mathematics • **Social discourses about sequentiality of mathematics** constructed exclusionary understandings of mathematical competence • **Social discourses about mathematics as defined** constructed mathematical activity as unrelated to identity, which was compatible with **absence of equity discourses**	• **Few available pedagogy discourses** to support identity-related equity issues to cross into mathematics • **Accountability discourses** constrained equity in mathematics to issues of **access and achievement**, inside the mathematics classroom, and not with respect to inequitable structures

Note: Discourses Are in bold.

similarities and differences across cases for each of the three boundaries just discussed. Then, I zoom out and discuss how differences in discourse dominance, as described in the previous section, shaped boundary framing.

Boundaries around Policy for Mathematics Education

The boundaries around policy for mathematics education encapsulated mathematics-specific policies, as well as mathematics- and ELA-differentiating policies. After first discussing mathematics-differentiating policies, which were similar across the districts, I then discuss mathematics-specific policies, which differed across districts.

Mathematics and ELA-Differentiating Policies. In both districts, mathematics- and ELA-differentiating policies were defined by the problem of and solutions for achievement (mechanism #1). While these policies were collectively determined by the district leadership team at RiverTown, at RockCity, these were top-down policies authorized by the cabinet (with little input by middle leaders, like the mathematics coordinators). That RiverTown and RockCity's subject-differentiating policies were defined by achievement is not surprising, as this aligns with previous research finding that district leaders most often identified outcomes-related problems (Burch & Spillane, 2005; Munter et al., 2023). In my two case districts, accountability discourses penetrated district leaders' problem framing, resulting in a "tunnel-vision effect" (Feniger, 2018) that emphasized performance on state standardized assessments over broader educational aims (Trujillo, 2013). Because mathematics and ELA were the most core school subjects, they were

the targets of each district's achievement-meeting policies, while less core subjects, like science and social studies, received less attention and resources.

Building on this previous work that has accounted for the broader influence of accountability and mathematics-as-core discourses on districts' problem framing (Burch & Spillane, 2005; Feniger, 2018; Munter eta l., 2023), my findings reveal that mathematics-as-sequential and defined discourses, as well as discourses about other subjects, shaped *boundary* framing. This is best demonstrated through the example of intervention at RiverTown. As previously discussed in Chapter 4, the elementary and middle school buildings prioritized reading intervention, because reading skills were perceived to be important for learning other subjects, and reading instruction is able to be integrated into other content areas. In addition, the middle school principal's personal discourses about mathematics as sequential delegitimized mathematics intervention, since reading intervention would not support student's mathematics learning. By contrast, at the high school, intervention was prioritized in mathematics because that was where the principal perceived greater "needs," and, since mathematics is sequential, students need to be supported in a course separate from their core mathematics class.

This example of intervention demonstrates two important insights from my study. First, boundary framing, particularly with respect to subject-differentiating policies, is a negotiation between competing subject demands. Given the finite time and resources districts have, especially those like RiverTown, discourses about the subject shape whether a policy (e.g., intervention) is for mathematics or for ELA. Currently, intervention at RiverTown prioritized reading, and this will likely continue, as Missouri recently passed new legislation (SB681, 2022) that increased requirements for school districts to engage in reading intervention. Likewise, at RockCity, the district had been implementing reading intervention for several years at the elementary level, but just recently adopted intervention for mathematics. This suggests that the mathematics SMC, while constructed by discourses about school mathematics, interacted with and was negotiated through discourses about other subjects to shape boundary framing.

For example, mathematics-as-core and reading-as-core discourses were negotiated and competed to be the priority and target of subject-differentiating policies. Specifically, in RiverTown and RockCity, it appears that discourses about literacy skills as supporting learning in other content areas were powerful in prioritizing intervention in reading over mathematics at the elementary grades. In their study, Burch and Spillane (2005) also found that discourses about literacy as a cross-cutting skill penetrated most leaders' personal discourses and were reflected in the prioritization of literacy in district efforts. This was less the case in the secondary grades in my two case districts, which suggests a potential difference in how the subject-matter context is negotiated and enters policymaking across the grade levels. That is, it is possible and likely, given differences in teacher preparation and classroom teaching roles (e.g., general versus subject-specific), that some discourses (e.g., literacy as a cross-cutting skill) may be more or less salient in some grades. Moreover, there might be some issues that arise more in some grade levels, like whether to departmentalize in a particular subject at the elementary grades, or the "tracking" and sequencing of advanced courses in secondary grades.

Second, the example of intervention reveals that boundary framing is a negotiation between personal discourses and social discourses from the SMC. With intervention, while the high school principal's personal discourses about mathematics as sequential legitimized mathematics as the target for intervention, those same discourses delegitimized mathematics for intervention at the middle school. So, at both the middle and high schools, boundary framing was negotiated between leaders' personal discourses about mathematics as sequential, and social discourses about mathematics and ELA as core, as well as social discourses about meeting students' needs. This suggests that, though the SMC provides dominant ways of understanding the subject (i.e., social discourses, as encoded in and enacted through policies and structures), how these sensemaking resources guide policy enactment is mediated by individuals' personal discourses. Because policy enactment involves the interpretation of policy by diverse actors, where actors draw upon discourses from the SMC for sensemaking, framing policies with respect to the subject matter is negotiated between personal and social discourses.

While personal and social discourses can be in tension, at RiverTown, individuals' personal discourses were compatible with the dominant discourses emanating from the SMC. At RockCity, this was not always the case. This often operated through mechanism #4, where middle leaders negotiated with one another, and the SMC, to enact achievement-addressing mathematics-differentiating policies authorized by the cabinet, as well as mathematics-specific policies they independently pursued. This was most obviously illustrated in the enactment of mathematics intervention for the elementary schools. Not only did the mathematics coordinator's personal discourses emphasizing conceptual understanding compete with the AID department's discourses related to direct instruction (as was currently enacted in reading intervention), her asset-based discourses were also challenged by the deficit discourses enacted in the *i-Ready* assessment system, which labeled students by the number of grade levels they were "behind."

As alluded to earlier, this fourth mechanism operated only in RockCity, and not RiverTown, due to its segmented organizational structure. Hierarchical structures created a division of policymaking between the cabinet—who authorized subject-differentiating policies—and middle leaders—who enacted those policies. Moreover, given horizontal segmentation, different departments negotiated competing personal discourses and agendas in collaborating for policy enactment. By contrast, RiverTown had a very flat (and small) district organizational structure, as well as intentional efforts to build communication and coherence among district leaders and across buildings. So, there was less division of policymaking authority, as well as fewer contending interpretations of policy issues among district leaders.

Mathematics-Specific Policies. That mechanism #4 operated only in RockCity helps to explain the difference in the mathematics-specific policies between the two districts. At RiverTown, the mathematics-specific policy (adoption of new curricular materials) was motivated by student "needs" and "gaps" in achievement (and not necessarily mathematics pedagogy). By contrast, the mathematics-specific policies at RockCity initiated by the mathematics coordinators were less motivated by achievement concerns, and instead, issues of instructional quality and access to rich learning opportunities in mathematics. Given the presence of mathematics-specific leaders at RockCity—which RiverTown did not have—equity and pedagogy-related discourses were more often employed to enact policies and frame boundaries.

Comparing the two districts' curricular policies reveal how different discourses were employed to differently shape boundary framing. At RiverTown, discourses about mathematics pedagogy were employed only to rationalize curricular materials as the solution for student "needs" in mathematics achievement. Specifically, instruction focused on recall and procedures was framed as the cause of student needs, so a focus on multiple solution strategies—through the *Eureka Math* curriculum program—would address those needs. By contrast, the secondary mathematics coordinator purposefully sought adoption of curricular materials that aligned with inquiry-based instruction, because, in her view, it is equitable, as it supports students' positive mathematical identities and is more effective for students of color. So, while RiverTown's mathematics-specific policies were constrained to achievement, the equity and pedagogy-related discourses emanating from the RockCity mathematics coordinators were powerful in expanding the boundaries of mathematics-specific policies beyond achievement concerns.

This difference between RiverTown and RockCity's boundary framings suggest the important role of subject-specific district leaders as "conduits" for subject matter expertise. The RockCity mathematics coordinators held strong views about high-quality and equitable mathematics education (extending beyond achievement concerns), which were employed in their policy enactments. At RockCity, leaders in the AID office also expressed and enacted their personal discourses about mathematics, though oftentimes these were in tension with the mathematics coordinators' discourses. As discussed earlier, district leaders at RockCity had different perspectives on high-quality education, which was reflected in their problem framing. This aligns with Jackson and colleagues' (2018) finding that district leaders in different offices have different framings of the same problems, suggesting that boundary framing is also mediated by organizational differences, a point I return to in the next sub-section.

Boundaries around Instruction

In this sub-section, I zoom out to the second of the third boundaries. Across both districts, I found what I call the “instruction” boundary, which encapsulated subject-neutral policies—those that ignored subject matter or treated subjects equally—that *directly* affect teaching and learning, as well as subject-specific boundaries, like the boundary of mathematics education policy just described. Falling outside this “instruction” boundary were other subject-neutral policies that were perceived to only *indirectly* affect classroom instruction, because they targeted issues (e.g., behavior, attendance) that leaders viewed as needing to be addressed prior to effective classroom instruction occurring. In addition to whether a policy directly addressed teaching and learning, at RockCity, the “instruction” boundary was framed in relation to organizational boundaries, and who had control and responsibility over particular matters. Efforts that fell within the “instruction” boundary were tasks under the curriculum and instruction (C&I) department, while those outside the boundary were the purview of the cabinet. By contrast, organizational boundaries were not used to frame policy boundaries at RiverTown.

In both districts, the subject-neutral policies that directly address instruction crossed into specific content areas. Sometimes, policies (e.g., rigor; tracking; tutoring) prioritized mathematics and ELA, because these were the most core subjects. Other times, policy enactment (e.g., standards-based or standards-referenced grading) included subject-specific implementation for most or all content areas. At RockCity, policy crossing was heavily facilitated by the content coordinators in the C&I department, as they were explicitly charged with supporting district-wide efforts (e.g., AVID, SRG, Tier One Instruction) in their subject area.

My findings related to the crossing of *some* subject-neutral policies into mathematics reveal four important contributions my study makes about boundaries and boundary framing. First, my study demonstrates how seemingly subject-neutral policies still interact with subject matter to shape policy enactment. This is best exemplified through tracking, where mathematics-as-sequential and defined discourses constructed mathematics as a symbol of social status, where community members associated mathematical competence with advanced coursework. Other subjects were not as imbued with these meanings, as they were perceived to be less sequential, defined, and core. This was especially true in RockCity, where mathematics was the only subject to remain tracked at the middle school when all other subjects were de-tracked. The example of tracking demonstrates how subject-specific discourses facilitated the crossing of subject-neutral policies into the boundaries of mathematics (mechanism #2). This negotiation over policies and whether they fall inside or outside the boundaries (Gallo-Crus, 2012) was shaped by the subject-matter context, as it "filters supposedly subject-neutral policies by giving different meanings to the same thing" (Grossman et al., 2004, p. 10).

Second, my study highlights the importance of research that examines policy boundaries as a conceptual object, as understanding what falls outside informs in what instances, and how, mathematics enters the policy conversation. Specifically, a focus on problem framing alone might have overlooked the findings just described—that districts' policy boundaries were framed in ways that facilitated tracking to cross more into mathematics than other subjects, where discourses about mathematics as sequential and defined shaped this boundary crossing. As another example, my study's attention to boundary framing also revealed that, though place-based learning penetrated science and social studies at RockCity, accountability and mathematics-as-sequential discourses together worked together to prevent place-based learning from crossing into mathematics. So, focusing on policy boundaries and boundary framing highlights how the subject-specific nature of policymaking extends beyond that of subject-specific and subject-differentiating policies—what Burch and Spillane (2003, 2005) have previously attended to— but also includes the enactment of subject-neutral policies.

In focusing on subject-neutral policies, it would not be unreasonable to ask which subject-neutral policies *could* have been mathematics-specific, but were not. One first answer might be efforts related to student behavior. For example, it is possible for district leaders to frame behavior as an instructional issue, where teachers explicitly outline their expectations for how students should participate (Boaler, 2002), in social interactions in the classroom and as students engage in mathematical work (Wilson et al., 2019). At both RiverTown and RockCity, however, behavior was most often framed as something that should be addressed separate from and prior to classroom instruction. At RockCity, for example, the main solution was the new creation of the behavior education plan, which primarily involved collaboration among leaders in the equity office and building principals, and not necessarily teachers or C&I coordinators. Behavior is just one example of the various policies in both districts that were framed as non-instructional, or *indirectly* affecting classroom instruction.

This points to the third insight that my study offers about boundaries and boundary framing—that in addition to Grossman et al.'s (2004) categorizations of the three ways policy approaches subject matter, there are (at least) two types of subject-*neutral* policies. This emerges from my finding that subject-neutral policies inside the "instruction" boundary were those that crossed into specific subjects, while policies on the outside stayed subject-neutral. Grossman and colleagues (2004) explained that "policy initiatives that support extra nutrition, mental health, or integrated support services, for example, are unlikely to be affected by subject matter as a context. Presumably, better services of this sort will support students' ability to learn in general" (p. 9). This was indeed the case in my two districts, as leaders rationalized such efforts as addressing the indirect effects of student learning. By contrast, policies that directly address teachers, students, the content, or relations among them are more likely to be shaped by subject matter differences, and therefore, have more potential to be implemented in subject-specific ways. This distinction between subject-neutral policies is important because it has implications for boundary framing. Specifically, some policies—those that directly affect instruction—only have to cross the mathematics-specific boundary, while others—those that indirectly affect instruction—also have to cross the "instruction" boundary. Though this suggests that some subject-neutral policies have greater potential to cross into the boundaries of mathematics (or any subject), whether or not educators should strive for this crossing, in part, depends on the potential of that subject-specific policy in addressing equity.

Fourth, my findings suggest that expanded policy boundaries do not necessarily result in greater access and inclusion (Cherry, 2010; Posselt et al., 2017), because policies that reproduce inequities might slip through the cracks (or, cross). Tracking was one such policy, since it served as a mechanism for segregation. In both districts, students of color were marginalized from advanced mathematics opportunities, where discourses about school mathematics (e.g., mathematics-as-core, sequential, defined) were influential in reproducing the racial hierarchy of mathematics ability (Martin, 2009). Especially in RockCity where debates about (de)tracking were more prominent, historically and currently, it appeared that these mathematics-specific discourses concealed norms about race, class, and intelligence that were operating covertly to maintain racial sorting (Oakes et al., 1997). This demonstrates how policy boundaries act as a medium for social exclusion and reproduces inequity (Lamont, 1992). So, addressing equity does not necessarily mean that more policies should specifically address mathematics, as less mathematics education might be more equitable (Shah, 2019). However, boundaries might be reshaped (rather than expanded) to facilitate equity-minded policies to enter the policy conversation for mathematics.

This, however, was not the case for the two districts in my study, as equity-minded efforts—sense of belonging at RiverTown, and equity and restorative practices PD at RockCity—fell outside this "instruction" boundary, and never crossed into mathematics. At RockCity, equity trainings focused on supporting individuals' learning about identity and privilege never crossed into mathematics, and instead, equity in mathematics was focused on (and reinforced the very notion of) "achievement gaps" (Gutiérrez, 2008). At RiverTown, sense of belonging stayed subject-neutral, because dominant discourses about mathematics as defined would have been incompatible with a mathematics-specific understanding of sense of belonging, since mathematics was seen as unconnected to students' identities. This suggests that discourses about mathematics as defined may prevent viewing mathematics as social and political (Rubel, 2017), which may be important for blurring the boundary between equity and mathematics learning. In addition, in both instances, an absence of equity and pedagogy discourses related to issues of identity and power maintained the subject-neutral form of these efforts, where they remained outside the boundaries of mathematics education (mechanism #3). As in the example of tracking, specific attention to policy boundaries revealed *why* sense of belonging and equity trainings were not mathematics-specific, and how the mathematics subject-matter context contributed to this.

As explained earlier with literacy and ELA, discourses about other subjects penetrated and were negotiated alongside the mathematics SMC to shape boundary framing. With equity-minded policies, discourses about social studies were oftentimes employed, as district leaders compared and made sense of this subject in relation to mathematics. Specifically, in both districts, leaders' personal discourses reflected how social studies was more compatible with discussions about social issues and students' identities, but mathematics was characterized as unrelated to such conversations. So, boundary framing involved comparing one subject's boundaries (i.e., mathematics) in relation to another (e.g., social studies, reading; Silver, 1997), which, in this case, served to exclude equity-minded policies.

Boundaries Defining the Work of the District

Finally, in this sub-section, I discus the third (and outermost) policy boundary: the boundaries that define the work of the school district. At both RiverTown and RockCity, leaders discussed how the role and responsibility of the school district expanded beyond achievement and content area instruction, to include other issues that—directly or indirectly—shape student learning, like behavior and students' mental health. However, the two districts differed in their framing of these boundaries that demarcate the district's jurisdiction. While RockCity saw all the district's efforts as informed by equity, RiverTown leaders focused on issues under their control. This difference is represented in RockCity's boundary representation (Figure 9) with the outermost circle labeled as "equity/work of the district;" RiverTown's outermost boundary (in Figure 4) is only labeled "work of the district." For example, RiverTown leaders saw "critical race theory" and other "divisive" and "politically-charged" topics as inappropriate for schools and not under their control, and therefore falling outside their policy boundaries. Though RockCity was not explicitly engaged in work informed by critical race theory, they were working to support staff to learn about the ways in which privilege and oppression were operating in schools and society, and working to dismantle systems and policies that they perceived as sources of inequity (e.g., behavior policies that disproportionately discipline Black students). RockCity saw these efforts as pursuing equity, in achievement as well as other aspects of schooling.

That only RockCity's outermost policy boundary was framed through equity is related to differences in the dominance of equity discourses between the two districts' SMCs. As discussed earlier, not only were equity discourses more often expressed by RockCity district leaders and enacted in policy texts and structures, they were also more accepted by the local community. As such, RockCity's dominant equity discourses were influential in framing the district's policy boundaries; without such discourses, RiverTown's policy boundaries oftentimes overlooked issues of equity.

Despite equity being a lens through which RockCity framed their policies, equity only penetrated mathematics education in terms of access and achievement—specifically, the "achievement gap" and access to inquiry-based instruction. As discussed in the previous section, though RockCity was engaged in identity-related efforts (e.g., equity trainings), these efforts were maintained as subject-neutral. So, there was a disconnect between mathematics' focus on achievement (in the classroom) and the equity training's focus on issues of identity and privilege (in systemic structures). The mathematics SMC maintained this boundary—through an absence of discourses that would facilitate the crossing (mechanism #3)—though it was also reinforced by organizational boundaries. Equity was disconnected from issues of (mathematics) instruction since efforts on the outside of the "instruction" boundary were under the cabinet's purview (and not the C&I department), which the chief equity officer was a part of. The lack of physical crossing among individuals from the equity and (mathematics) instruction units preserved this boundary, as boundary shifting can only occur after such crossing has taken place (Zolberg & Long, 1999).

Because equity is a concern across all aspects of schooling, including issues of discipline, nutrition, transportation, it is perhaps not surprising that equity trainings were subject-neutral, and did not penetrate mathematics in particular. This is also reflective of old debates about whether equity should be a central issue in mathematics education (e.g., Heid, 2010) and, to some extent, continuing conversations regarding the extent to which equity is constitutive of (e.g., Martin et al., 2010; Louie & Zhan, 2022) or orthogonal to (e.g., Matthews et al., 2022) mathematics teaching and learning. Ignoring subject matter not only simplifies the work of policymaking, but also allows policymakers to pursue one course of action that will apply to various people/buildings. However, subject-neutral policies still interact with subject-matter contexts to shape policy enactment. As seen with RockCity, though equity trainings were not prioritized in any specific subject (like with tracking) or implemented in subject-specific ways (like standards-referenced grading), it seemed to still be interpreted differently in different subjects. Specifically, compared to social studies, mathematics was deemed as less compatible with equity trainings, as issues of privilege and oppression were less relevant to mathematical content (where the focus is on solving procedural problems). This similarly played out in RiverTown, where matters related to identity and context were more relevant to social studies and reading than mathematics.

Discourse Dominance and Boundary Framing

In this final sub-section, I revisit my earlier discussion on discourse dominance in the mathematics SMC and discuss it explicitly in relation to boundary framing. Across the four boundary framing mechanisms, the dominant discourses (accountability, and mathematics-as-core, sequential, and defined) in each district's SMC were also those that were most influential in boundary framing, while discourses that were contested (equity and pedagogy) were the least influential. Specifically, I found that, across both districts, mathematic-as-core, sequential, and defined discourses were powerful in legitimizing mathematics as the target for subject-differentiating policies focused on achievement (mechanism #1) and prioritizing mathematics for subject-neutral policies (mechanism #2). By contrast, discourses related to equity and mathematics pedagogy were fairly absent in the framing of policies, primarily employed by RockCity mathematics coordinators in their policy enactments (mechanism #4). Moreover, in both districts, the absence of these discourses served to maintain policies as subject-neutral (mechanism #3).

This relation between discourse dominance in the SMC and influence in boundary framing aligns with previous research on problem framing in schools, where Coburn (2006) found that resonant frames tapped into individuals' preexisting beliefs and/or invoked ideas that had widespread acceptance. In my study, achievement-focused policies that targeted mathematics invoked both personal and social discourses about accountability and mathematics as core. Likewise, intervention and tracking structures connected to individuals' implicit discourses about mathematics as sequential and well-defined, and that only *some* people can be good at mathematics; others need reteaching, remediation, or a slowed-down curriculum.

In some instances, frames that enacted discourses about mathematics pedagogy achieved resonance when they also aligned with dominant discourses. At RiverTown, discourses about multiple solution strategies connected with discourses about meeting students' need in converging on the adoption of new curricular materials. At RockCity, regarding mathematics intervention for the elementary schools, the progression of students' mathematical thinking connected discourses about conceptual understanding and discourses about the sequentiality of mathematics. As another example, the mathematics coordinators' promotion of inquiry-based instruction as an equitable approach connected with social discourses about achievement gaps.

Inversely, Courtney and Mann (2020) suggest that features of school systems persist unless they are contra-indicated by new discursive structures. This helps explain why equity-minded policies at RiverTown and RockCity remained subject-neutral: there were few equity discourses to necessitate a mathematics-specific understanding of sense of belonging or equity trainings. Even if there were discourses to support these policies in crossing into mathematics, they would have likely been rejected or nullified (Trujillo, 2013), especially at RiverTown: not only was "equity" deemed as unacceptable by the local community, there were also mathematics-as-defined discourses that contradicted thinking about students' identities and belonging within the mathematics classroom.

Limitations

Before discussing the implications of my study, I wish to acknowledge some limitations. First, a common critique of case study research is that the methodology biases towards verification of the researcher's preconceived notions (Savin-Baden & Major, 2013). However, Flyvbjerg (2006) argued that case study contains no greater bias than any other method. In addition, I worked to establish validity and reliability through triangulation, adequate engagement in data collection, and member checks (Merriam and Tisdell, 2006). Triangulation, in particular, is one of the defining features of case study (Yin, 2015), as multiple sources of evidence converge around the same findings. In my study, I triangulated data by cross-checking interviews, artifacts, and observation field notes. Moreover, I engaged in data collection until I experienced data saturation, which also signaled an appropriate time for me to conduct member checks. Specifically, in the second interview, I shared with participants my tentative interpretations and asked for their feedback, most of which confirmed and clarified my findings. I also made refinements in response to the few instances in which participants did not completely confirm my interpretations.

A second limitation pertains to the scope of my claims. In this study, I focused on districts' subject-matter contexts, boundary framing of policy, and the interactions between the two. As such, I attended to district policymaking, rather than policy implementation and the ways specific policies unfold in schools and classrooms in interaction with teachers and students. My study provides an important district-level understanding, but future research could investigate how districts' boundary framing for subject-specific policies are interpreted and enacted by the individuals (e.g., teachers and students) the policies are intended to target.

Third, my two districts are situated in the same state. Though this allowed me to investigate two different community contexts (and the ways this shaped the mathematics SMC and boundary framing) while holding the state policy context constant, it is possible that a similar study in a different state might produce different findings. This points to future areas of research, which I address in the following section.

Implications

Implications for Research

The results of this study demonstrate the importance of attending to boundary framing, in addition to problem framing. While problem framing can highlight the problems leaders identify and how they frame them, understanding boundaries reveal *how* and *why* policies are taken up specifically for mathematics, and the ways in which only some subject-neutral policies (and not others) penetrate mathematics education. In attending to the why, I focused on subject-matter context and the ways subject matter differences organize leadership and policymaking. Specifically, my findings point to four specific mechanisms through which the subject-matter context shaped boundary framing. Additional research needs to be conducted to understand the external validity of these mechanisms, in which sorts of districts these mechanisms operate, and the possibilities of others.

Although this study centers the subject of mathematics, my attention to the processes of boundary framing and subject matter context would likely be of interest to education research across a range of content areas. This is particularly true for two of my findings: that some discourses might be more salient in some grade levels; and that discourses about other subjects (e.g., reading, social studies) are negotiated with discourses about mathematics. While my study did not specifically attend to these issues, future research could investigate differences in how the subject-matter context is negotiated across grade levels, and the specific grade-level factors that contribute to those differences. Work could also be conducted on the interactions among discourses of different subjects, specifically the discourses that might reinforce mathematics-specific discourses, and those that weaken or challenge mathematics-specific discourses.

Another area of future research pertains to issues of place. Unlike research that typically focuses on large suburban and urban districts, my two districts are small—one rural and one micropolitan. These unique places, and the differences across, highlighted the mediating roles of organizational structure and local context in shaping both the mathematics SMC and boundary framing. While my two case districts differed with respect to economic structure and political makeup, future research could more explicitly attend to these factors, including how they contribute to community discourses about (mathematics) education and, therefore, boundary framing of subject-specific policy.

Moreover, given that equity and pedagogy discourses were contested in my two case districts, and discourses about accountability and mathematics as core, defined, and sequential were dominant, future research is needed to investigate how context-specific these findings are. That Missouri has been subjected to similar accountability discourses as other states in the U.S. suggests that accountability and mathematics-as-core discourses would hold in districts across a range of settings and characteristics. On the other hand, it would be fruitful for future research to specifically focus on districts in which equity-minded policies, especially those that address more critical dimension of identity and/or power (Gutiérrez, 2012), penetrate and cross into mathematics. Intentional sampling of districts of this sort would inform the discourses that facilitate the reshaping of policy boundaries, specifically in ways that promote greater equity.

Finally, my attention to discourses about equity and mathematics pedagogy adds to the work of Burch, Spillane, Grossman and colleagues (2004; 2005) that primarily investigated dimensions related to the epistemology of the subject (i.e., core; scope; static; sequential; well-defined). I found that (the absence of) these discourses were especially important in maintaining the subject-neutral nature of equity-minded policies (mechanism #3), while mathematics-as-sequential and defined discourses countered such efforts in mathematics. These findings may be relevant for researchers interested in partnering with school districts in their improvement efforts. While it might be appealing for policy researchers and school districts to pursue subject-neutral approaches to equity, my findings suggest the need to consider how districts' subject-matter contexts might interact with and shape such efforts in subject-specific ways. For mathematics education researchers, supporting districts' equity efforts in mathematics might first require addressing discourses about mathematics as sequential and defined, as these discourses maintained the boundary between equity and issues of mathematics education, and reproduced inequitable structures like tracking. Furthermore, graphic elicitation might be a helpful tool for researchers to employ with district leaders, to elicit conversations about the policy boundaries that are operating in the district, the ways in which subject matter interacts with policies and boundaries, and potential ways for blurring and reshaping those boundaries. The constructed diagram could also be revisited and updated in feedback cycles as researchers and district leaders collaborate together in revising and implementing improvement strategies.

My findings that mathematics-as-sequential and defined discourses reinforced narrow frames of mathematical activity and competence are also relevant to mathematics educators and researchers working with teachers. For example, teachers' instruction, especially with students from historically marginalized populations, is shaped by their views of students' mathematical capabilities (Jackson et al., 2017; Wilhelm et al., 2017). It is likely also informed by their personal discourses related to the epistemology of the subject, specifically the extent to which mathematics is sequential and well-defined. The findings of this study would suggest that teachers (and leaders) who view mathematics as inherently linear are also likely to view only *some* students as capable of engaging in rigorous mathematical activity, and therefore, likely to respond to students who are currently struggling in unproductive ways. Though there has been some work connecting these two constructs (see Horn, 2007), more research should be conducted to understand relations between the two, as well as productive ways to support individuals in interrogating these views, including whether these views should be addressed simultaneously or one prior to the other.

Implications for K-12 School Districts

Lastly, I turn to implications for K-12 school districts. First, the findings of my study suggest that districts' policy efforts are likely to fail if there is not attention to underlying discursive structures, especially those concerning the subject matter. For example, districts likely cannot simply “de-track” when there are implicit discourses about mathematics as sequential and defined and that only some people can be good at mathematics. In the two districts that were the focus of this study, these discourses operated in hidden ways, sometimes in ways that reproduced social exclusion and inequity (Lamont 1992), as was the case with tracking. These discourses also precluded attention to issues of context and students’ identities with respect to mathematics, so interrogating these discourses might serve to expand policy boundaries in ways that allow for more equity-minded policies to enter into mathematics.

As such, school district leaders should work to examine the ways taken-for-granted discourses about the subject shape their policymaking, especially in ways that perpetuate inequities. For example, as was the case at RiverTown and RockCity, mathematics-as-defined discourses were enacted in the use of standardized tests to narrowly define mathematical competence as finding the “one” right answer. Interrupting these discourses could involve examining how other forms of assessment (e.g., those that focus on students’ strategies and thinking) might reveal greater information about students’ mathematical knowledge, as well as broaden opportunities for students to be mathematically competent (e.g., Kazemi et al., 2014). With respect to mathematics-as-sequential discourses, district leaders might carefully consider what kind of mathematical content or skills students need to master in order to succeed in future mathematical learning. For example, it seems that, especially given the use of standardized tests to measure students who are “behind” or “needing” intervention, mastery is often equated with procedural fluency. But, mastery should also include conceptual understanding, and making connections between related mathematical concepts. This would also help move past views of mathematics as sequential, and instead, as a web of interconnected mathematical ideas.

That subject-neutral policies still interacted with the subject matter suggests that districts and district leaders might intentionally examine and plan for these interactions. For example, in both districts, equity-minded policies differently interacted with social studies than mathematics, in ways that precluded crossing into the boundary of mathematics education. This offers one potential avenue for district leaders to anticipate subject-specific policy enactment: leaders might consider how the subject matter filters subject-neutral policies, and intentionally work to support crossing into content areas. This might include reflecting on the learning demands of policies and how teachers might make sense of subject-neutral policies in relation to different content areas.

For districts like RockCity with leaders explicitly charged with supporting education in specific subjects, content coordinators might be well positioned to support such efforts. With expertise and robust views of high-quality and equitable mathematics education, subject matter specialists could help communicate and transfer subject-neutral policies into their respective content areas. Unfortunately, in many districts, these specialists are peripheral to the main lines of authority, while those with such decision-making authority do not necessarily have content expertise (Coburn et al., 2009). Therefore, it is important that senior district leaders (e.g., cabinet members) collaborate with colleagues with subject matter expertise, and empower them with the authority to translate subject-neutral policies into specific subjects. In organizationally segmented districts like RockCity, this would require collaboration among multiple departments, like

C&I and equity, where leaders from respective offices should examine and negotiate the ways in which their respective discourses align or misalign (e.g., equity as identity versus equity as access and achievement), and work to connect subject-neutral ideas to the specific pedagogical and epistemological assumptions and practices of the subject.

These subject-matter roles, however, are oftentimes vulnerable to budget cuts; indeed, the instructional coaches at RockCity were only temporarily employed through ESSER funding. Moreover, many school districts—like RiverTown—do not have subject-matter experts at the district central office. So, a potential alternative is teacher leaders and leveraging their content area expertise in district wide decision-making. For example, at RiverTown, the district instructional coach partnered with a teacher leader at one of the elementary schools to plan and facilitate professional development for teachers. Additional opportunities might include involving teacher leaders in conversations about the mathematics instructional vision the district might promote and the ways in which mathematics-specific policies (e.g., intervention; assessment) could support high-quality and equitable mathematics education. Furthermore, district leaders might task teacher leaders with translating subject-neutral policies like sense of belonging or equity to their specific content areas. However, because teacher leaders have limited time for leadership, especially when they are also full-time teachers (like those at RiverTown), district leaders should selectively engage teacher leaders in opportunities that allow them to employ their content area expertise in ways that support the learning of others, rather than, for example, addressing logistical issues or programmatic concerns (Conner et al., 2022).

A second alternative for subject-matter expertise in district policymaking is external sources. At RiverTown, the chief academic officer collaborated with mathematics consultants from the state department of education. While these individuals promoted pedagogy-related discourses that aligned with inquiry-based instruction, they also, given their affiliation with the state, enacted accountability-discourses. Therefore, school districts should carefully interrogate the ways in which such collaborations with external stakeholders might expand or constrain the boundaries of subject-specific policymaking.

Conclusion

The results of this study demonstrate the ways in which district policymaking is subject-specific, and how policy boundaries function to constrain which efforts penetrate and cross into mathematics. As researchers, policymakers, and K-12 district leaders work to reshape policy boundaries in pursuit of ambitious and equitable mathematics education, it is my hope that lessons from this dissertation will encourage individuals to interrogate how taken-for-granted discourses about the subject potentially narrow our efforts to matters of classroom instruction, and overlook the structures and policies that are operating in schools but sometimes have a more peripheral influence on mathematics. Until we attend to what falls outside the boundaries, and the role of the subject matter in that policy work, realizing the field’s vision may be harder to achieve.

APPENDIX A: INTERVIEW 1 PROTOCOL

Before turning the tape recorder on:

1. *Explain the purpose of the interview.*

Thank you for taking the time to meet with me today. I'm broadly interested in understanding the district's effort for mathematics, and situating that in the district's other initiatives and policies. I'm going to be asking you questions about your responsibilities, your perspectives on the district's current challenges, goals, and initiatives, and how you interact with your colleagues.

2. *Tell the participant:*

Before we begin the interview, I want to remind you that participating in this study is voluntary and your responses are completely anonymous. At any point during the interview, if you would like me to turn off the recorder, just tell me to do so. Do you have any questions about the study before we begin?

<u>Background</u>

1. First, I'd like to ask about your current position in the district.
    a. What is your official title?
    b. How many years have you been in this position?
    c. Have you ever taught in the classroom?
        i. *If so*, what subject(s), and what grade levels?
    d. What are your current job responsibilities?
        i. What are the tasks you perform to accomplish these responsibilities?
            1. If any, what is the subject matter focus of these tasks?
            2. Are there any tools or materials you use?

<u>Current District Challenges, Goals, and Initiatives</u>

Next, I have a few questions about the district's current challenges, goals, and initiatives.

2. Are there currently any challenges in the district that have been made an explicit focus?
    a. *(For challenges particular to students –e.g., motivation, reading skills –ask)* Is that a challenge for all students or is it an issue with certain students/schools/grades/?
        i. Probe on why this is a challenge for some students.
    b. Is there general agreement that [the challenge] is indeed a challenge?
    c. How did it come to be a focus?
    d. What do you see as the source of [the challenge]? (Probe for policies/structures, adult behaviors/practices/mindsets that may be contributing)
    e. Why is [the challenge] important to address or resolve?
    f. What is the district's current plans for addressing that challenge?

g. Is this [challenge] a concern in every subject, or more in some subjects than others?
   i. *(If yes),* What do you see as the reason for that greater emphasis in [subjects]? Has there been talk about implementing this in [other subjects]?
   ii. *(If no),* Do you see this playing out similarly or differently across subjects, for example, in mathematics and reading? Is this intended to be implemented similarly across subjects?

3. Are there currently any challenges in the district with respect to equity?
   a. *(If so),* I'd like to ask you some similar questions about that/those challenge(s).

4. Are there currently any challenges in the district with respect to mathematics?
   a. *(If so),* I'd like to ask you some similar questions about that/those challenge(s).

5. Beyond these challenges, are there initiatives specific to mathematics that you or the district is currently engaging in?
   a. *(If response includes PD)* What is the plan for math PD? What will be the focus of that PD?
   b. *(If response includes coaches/instructional mentors)* What are the expectations for coaches?
   c. Are there any initiatives that you would like to engage in, but are currently not, or unable to?
   d. Is(are) the current math initiative(s) in conflict with any other initiatives that are currently operating in the district? If so, how are you working to resolve these issues?

6. What mathematics curriculum materials are currently being used in the district?
   a. When were those materials adopted?
   b. What was the state of the curriculum prior to the adoption?
   c. What motivated the adoption?
   d. Are there any future plans for curriculum development/adoption?

7. The mathematics-related challenges and initiatives you previously described, are these also challenges in other subjects?

8. *(If testing/standards has not been brought up yet)*, What role, if any, does testing play in your district? State standards?

Relationships with Others

Now I'd like to ask you a few questions about your contact with different people in the district.

9. Who or which units in the district do you (or your office) typically engage with?

10. Who or which units in the district are influential in making decisions regarding mathematics? *(If response does not include participant or participants' unit, probe)*
    a. *For each unit*, In your view, what is their agenda regarding mathematics?
    b. Are you generally "on the same page" as others regarding decisions about mathematics?
        i. Why or why not?
    c. What decisions are you/your office involved in? Are there any decisions you are not involved in, but would like to be? What about district strategic planning?

11. How are decisions in the district typically made? Can you share an example?

12. Do you participate in regularly scheduled meetings? *If so*:
    a. With whom and how often?
    b. What do you generally discuss or decide at those meetings?
    c. *(If there's relevant meetings, ask for participation)*

<u>Suggestions for Others to Interview</u>

13. Who else would you recommend I talk to, to learn more about challenges and initiatives in the district?
    a. (*For each person named*), What is that person's role in the district?

<u>Closing Questions</u>

14. Is there anything that I have not asked that would help me better understand your role in the district and the district's current challenges and initiatives specific to mathematics education or in general?

APPENDIX B: SOURCES FOR INTERVIEW 1 QUESTIONS

Question	Source
1i	Inspired by Burch & Spillane (2003)
2,b,c,d,e,	Munter, Nguyen, & Kinder (2020)
2a,f	Middle School Mathematics and the Institutional Setting of Teaching (MIST)
3, 4	Inspired by Munter et al. (2020)
5a,b,d	MIST
5c	Missouri equity interviews
6	MIST
8	Trujillo (2013)
10a,b	MIST
11	Truillo (2013)
12-14	MIST

Note. Unless otherwise indicated, sub-questions are from the same source.

APPENDIX C: INTERVIEW 2 PROTOCOL

Before turning the tape recorder on:

1. *Explain the purpose of the interview.*

Thank you for taking the time to meet with me today. As I'm nearing the end of my data collection, I wanted to follow-up on some things that have emerged since we last talked. I also wanted to share with you some initial findings, and get your thoughts on some of my noticings.

2. *Tell the participant:*

I want to remind you that participating in this study is voluntary and your responses are completely anonymous. At any point during the interview, if you would like me to turn off the recorder, just tell me to do so. Do you have any questions about the study before we begin?

<u>Updates on Current District Challenges, Goals, and Initiatives</u>

In our first interview, I asked you to share about the district's current challenges, goals, and initiatives. I'd like to revisit those.

1. You shared that the district's main challenges were…. Do those seem right?
    a. *(For each one),* At this point, how do you feel about your and the district's progress in addressing this [challenge/goal]?
        i. You shared/I learned in [these observations] that the district is addressing this challenge by [engaging in this solution]. How did that come about? How is that going?
        ii. Are you facing any obstacles or frustrations in addressing this challenge?
        iii. Ask about boundary crossing:
            1. It seems that this effort is not specific to any content area. Do you agree or disagree with that assessment?
                a. *(If yes),* Is this being implemented similarly or differently across subjects? How do you see this impacting mathematics? How so?
            2. It seems that this challenge/solution seems to be more directed at [specific subject(s)]. Do you agree or disagree with that assessment?
                a. *(If yes),* What do you see as the reason for that greater emphasis in [subjects]? Has there been talk about implementing this in [other subjects]?

2. You shared that you are working to….At this point, how do you feel about your progress in addressing this?
        i. Are you facing any obstacles or frustrations in addressing this?

3. Since our last interview, are there any additional challenges, goals, or initiatives that have emerged?
    a. *For challenges particular to students –e.g., motivation, reading skills –ask)* Is that a challenge for all students or is it an issue with certain students/schools/grades/?
        i. Probe on why this is a challenge for some students.
    b. Is there general agreement that [the challenge] is indeed a challenge?
    c. How did it come to be a focus?
    d. What do you see as the source of [the challenge]? (Probe for policies/structures, adult behaviors/practices/mindsets that may be contributing)
    e. Why is [the challenge] important to address or resolve?
    f. What is the district's current plans for addressing that challenge?
    g. Is this [challenge] a concern in every subject, or more in some subjects than others?
        i. *(If yes),* What do you see as the reason for that greater emphasis in [subjects]? Has there been talk about implementing this in [other subjects]?
        ii. *(If no),* Do you see this playing out similarly or differently across subjects, for example, in mathematics and reading? Is this intended to be implemented similarly across subjects?

Graphic Elicitation

Next, I'd like to share with you a diagram I made that represents some initial conjectures I have about the district's efforts to support math education, and how those efforts are more broadly situated in the other initiatives the district is engaged in. This diagram was created based on my initial analysis of conversations I had with people in the district, as well as observations of various meetings and other events.

I would like to get your thoughts on my interpretations, whether you agree or disagree, and why. Getting your feedback and perspectives will help me make sure that I am accurately representing what is going on in your district.

We will talk about one aspect of the diagram at a time. I will sequentially reveal to you aspects of the diagram.

In this order:

- Slide 1 reveal "instruction" boundaries and discuss these policies
- Slide 2: reveal boundaries around math, and discuss math-specific policies
- Slide 2: reveal boundaries around ELA, and discuss math- and ELA-specific policies
- Slide 3: discuss how subject-general policies cross into subject-specific boundaries
- Slide 5: discuss policies that fall outside the teaching/learning boundary

4. *(For each reveal, explain the related parts. Then, ask)* To what extent do you feel this is accurate?
    a. Are there any efforts that is not included here, that you think should be?
    b. What do you see as the reason for this effort being implemented in these subjects, but not others?
    c. Has there been talk about implementing this in [other subjects]? Why do you think that is?

5. Beyond the specific aspects of the diagram that we have discussed, what are your thoughts on the diagram generally? To what extent do you feel it accurately represents how the district's efforts to support mathematics education are more broadly situated in the other efforts the district is engaged in?
    a. I sorted these efforts based on whether or not they attend to teaching and learning, and if so, whether they attend to specific subjects. Would you have similarly sorted these, or might you have differently sorted them or created different categories?
        i. *Specifically, probe on the perceived presence of the teaching/learning boundary.*

<u>Closing Questions</u>

6. Is there anything that I have not asked that would help me better understand the district's challenges and efforts?

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