# Promises and Pitfalls of Crafting Coherence Around a District-Wide Vision for Equity-Centered Instruction

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## Abstract

Although ample scholarship has examined the coherence of district-level instructional systems, the literature pays limited attention to crafting coherence around district visions for equitable instruction. In this multiple case study, we use interviews, documents, and observations to examine four districts' efforts to craft coherence around a shared vision for equitable mathematics. We find that in only one district did district and school leaders describe a shared vision, bolstered by consistent messaging. Across the four districts, the critical elements of equitable mathematics (e.g., cultural identity, power) received substantially less attention in instructional visions and district supports and structures than dominant elements (e.g., ambitious mathematics, achievement). We document the promises and pitfalls to crafting coherence around a shared vision for equitable instruction.

## Equity-Centered Instruction

For decades, practitioners and policy scholars have highlighted the stubborn challenge of crafting district-wide coherence for instructional improvement (e.g., Cohen & Ball, 1999; Desimone, 2002; Fuhrman, 1993; Honig & Hatch, 2004; Newmann et al., 2001; Polikoff et al., 2020). The rich literature on coherent instructional systems offers insights into how to support instructional improvement system-wide—through, for instance, adopting aligned curricular resources and professional learning (PL) experiences that support shared sensemaking (Cohen & Ball, 1999; Cohen & Hill, 2008; Desimone et al., 2019; Forman et al., 2021).

Although this literature states the importance of orienting around a specific vision for instructional improvement (Cobb & Jackson, 2011; Diliberti et al., 2023; Polikoff et al., 2020), it also pays *limited attention to the nature and role of visions* in coherent instructional systems—what those visions are and how districts communicate and support them. We draw on organizational and management literature that defines organizational vision as a future-oriented description of an organization's aspirations (Hallinger & Heck, 2002; Hill & McShane, 2008; Nanus, 1992; van Knippenberg & Stam, 2014). An instructional vision in particular serves as an aspiration or anchor (Polikoff et al., 2020) that attends both to "what instruction sounds and looks like" as well as "what it accomplishes" (Munter & Wilhelm, 2021, p. 343; see also Cobb & Smith, 2008; Gurley et al., 2015; Hammerness, 2001; Munter, 2014). In this sense, whereas educational literature often laments the loose coupling of espoused educational goals or policies and enacted practices (e.g., Meyer & Rowan, 1978; Yurkofsky, 2020), we approach our study from the assumption that an instructional vision is *intended* to differ from the district's current practices because it represents a future-oriented aspiration of what the organization can do.

In addition to the limited attention to instructional visions, the equity lens in much of the school improvement and coherent systems literature focuses on access to rigorous content and academic achievement and pays less attention to critical dimensions like cultural identity and power. To understand the equity dimensions of district visions, we draw on Gutiérrez's (2009, 2011) conceptualization of two axes of equitable mathematics: a *dominant* axis that focuses on access to rigorous educational opportunities and academic achievement, and a *critical* axis that focuses on leveraging and affirming student identity through mathematics instruction and preparing students to understand power dynamics in mathematics and society more broadly. Gutiérrez highlights the importance of attending to both dominant and critical axes to draw out contradictions that arise when only one axis (especially the dominant one) is addressed (e.g., focusing on student performance on standardized tests with minimal attention to students' cultural identities).

Prior work has shown that collaboration between and meaningful support from both district and school leaders is critical for crafting coherence within an instructional system (e.g., Honig & Hatch, 2004; Johnson et al., 2014; Leithwood, 2010). Further, policy literature suggests that leaders themselves, informed by their own beliefs and prior experiences, may interpret and frame instructional policies and approaches differently (Coburn, 2005). As such, we focus our study on the nature of the instructional visions our districts have in place and the extent to which district and school leaders describe a shared vision for mathematics education. We then unpack why visions may or may not be shared by examining how each district communicates its vision and the extent to which district supports (e.g., PL) align with their aspirations. This enables us to examine the affordances and challenges to districts crafting coherence

around a shared vision. Drawing on a multiple case study of four U.S. districts, we ask the following questions:

1. What are district leaders' and school leaders' visions for equitable mathematics, and to what extent do district and school leaders share a common vision?
2. How do districts support coherence around a shared vision for equitable mathematics?
3. What barriers exist for crafting district-wide coherence around a vision for equitable mathematics?

In addressing these questions, we examine an understudied piece of coherent instructional systems—instructional visions—by drawing on a conception of equity inclusive of power and identity (Gutiérrez, 2011; Roegman et al., 2022). In the sections that follow, we introduce the study context, the empirical foundation of the study, our conceptual framework, and our methods. We then present our findings, drawing on themes across the four districts as well as insights from one district in particular whose district and school leaders communicated a relatively consistent shared vision for equitable mathematics. We close with a discussion of our findings and implications.

## Study Context

Our paper is a substudy of a larger research project that examines curricular and instructional decisions about middle school mathematics in four large districts across the United States. These districts received funding from the Bill & Melinda Gates Foundation to adopt curricula and aligned professional learning for middle school teachers; its ultimate goal was to support historically marginalized students, especially those who are Black, Latinx, multilingual learners, or experiencing poverty. The broader study sought to investigate whether certain practices at the district and school levels can improve conditions for mathematics teaching and learning. For this paper, we use district documents, school and district administrator interviews, and PL observations from the broader study to examine districts' visions of mathematics instruction and facilitators and barriers to enacting those visions. This study context allows us to explore vision coherence within each district and compare the nature of supports for those visions among districts in different geographical, sociopolitical, demographic contexts.

## Empirical Background: Organizational and Instructional Visions

Educational literature on school and district improvement has long discussed the need for schools to have a shared sense of purpose, although there has been a general lack of clarity on the distinction between organizational visions, missions, and goals (Hallinger & Heck, 2002) and limited attention to the role of district-level instructional visions. The general consensus within management literature, however, is that organizational vision—as distinct from mission statements and goals—is important for individual and organizational effectiveness. Organizational vision enhances individual motivation, perceptions of work as meaningful, goal attainment, and performance within the organization (e.g., Gochmann et al., 2022; Jensen et al., 2018; Jonyo et al., 2018; Maran et al., 2022; Qin et al., 2023; Zhang & Bloemer, 2010). At the same time, studies indicate that the relationship between vision and outcomes depends on several other factors and conditions within organizations, such as the preexisting values and characteristics of individuals in them (van Knippenberg & Stam, 2014).

In education, studies have concluded that orienting school communities around a shared and explicit *school* vision can contribute to teachers' sense of ownership, job satisfaction, and commitment to their work and the profession (McInerney et al., 2015; Moraal et al., 2024; Skaalvik & Skaalvik, 2011; Whipp & Salin, 2018). Furthermore, studies show the value of *teachers'* individual instructional visions in their classrooms. This scholarship has found associations between the nature of teachers' instructional visions in mathematics, their selection of instructional tasks for students, and their instructional quality (Munter & Correnti, 2017; Wilhelm, 2014). Teachers' own instructional visions are also related to their colleagues' visions (Munter & Wilhelm, 2021), indicating the importance of cultivating a shared vision among educators throughout the system.

Educational leadership studies further indicate the value of visionary, charismatic, and transformative leadership as particularly important for orienting schools around improvement (Hallinger & Heck, 2002; Leithwood et al., 1998; Sergiovanni, 1990). School leaders who actively work to orient their school community around a shared vision for instruction can support improvements in school-wide performance and achievement, school culture, teachers' understandings of instructional expectations, and teacher and student motivation (Bullock & Moyer-Packenham, 2019; Katterfeld, 2013; Leithwood et al., 1998; Tichnor-Wagner et al., 2016). Leaders can do so through motivational language and by consistently reinforcing and celebrating high academic expectations (Tichnor-Wagner et al., 2016). At the same time, the structure of schools and districts, such as the siloed and departmentalized nature of schools, can challenge efforts to develop shared vision (Siskin, 1997). Although most of the educational leadership literature addresses the school level, district-level studies indicate the importance of district leaders engaging in instructional leadership by not just establishing instructional visions but also ensuring that the district's organizational structure supports that vision and engaging actively in discussions and PL around teaching and learning (Honig et al., 2017; Petersen, 1999).

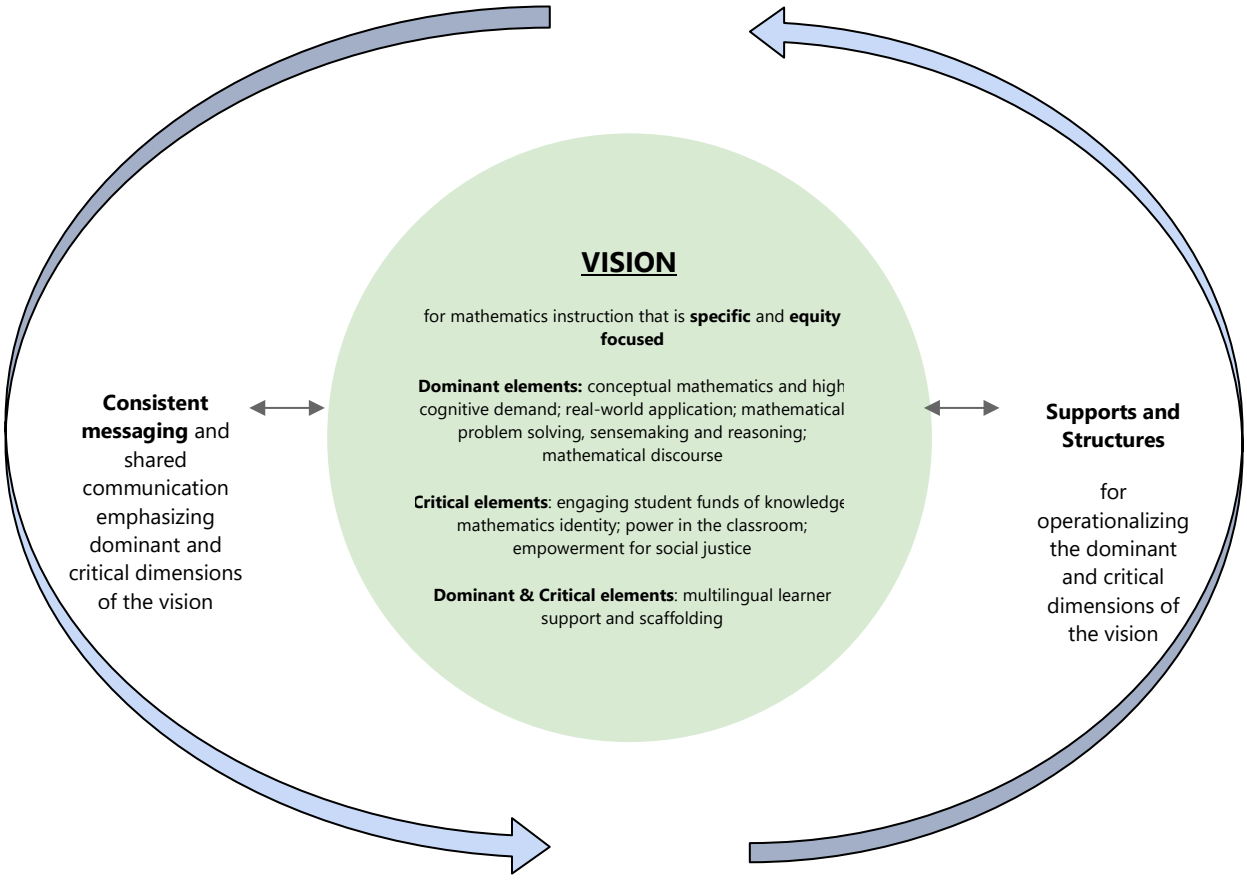
Thus, although ample management and educational literature speaks to the importance of shared organizational visions and leaders who can champion those visions, much of the educational literature on instructional visions focuses on the school level. Less studied is the nature of subject area-specific vision statements at the district level, whether and how these visions are oriented around equity (especially equity that includes identity and power as well as access and achievement), and how these visions are communicated and supported across a district. Given the centralized nature of certain decisions in U.S. school districts (e.g., resource allocation decisions, curriculum adoption) and studies that show the importance of district-level instructional leadership (Honig et al., 2017), understanding coherence around a vision at the district level and not just at the school level is an important area of inquiry.

## Conceptual Framework: Cohering Around Instructional Visions

Our study starts from the premise that advancing equitable mathematics requires attention beyond individual teachers' practice, including the extent to which teachers are supported within a coherent system of instructional improvement (e.g., Cobb et al., 2020; Cobb & Jackson, 2011; Leithwood, 2010; Polikoff et al., 2020; Rorrer et al., 2008), and that a key part of this coherent system is a vision held in common throughout the district that guides organizational behavior. To ground this study, we draw on concepts of organizational visions, equitable mathematics, and coherent instructional systems (Figure 1).

**Figure 1.** Conceptual framework: Applying Gutiérrez's dominant and critical axes of equitable mathematics to examine instructional visions.

## A. Organizational Visions




Drawing on organizational and management literature, we posit that visions orient members of the organization around a shared sense of purpose, meaning, and values and they motivate members toward action (Bolman & Deal, 1997; Gochmann et al., 2022; Nanus, 1992; van Knippenberg & Stam, 2014). Although the coherent instructional systems literature attends little to visions, we argue that instructional visions may serve as important "simplification systems" that offer cognitive and organizational guidance around which district and school leaders can craft coherence (Honig & Hatch, 2004, p. 20). We draw on the notion in the organizational literature that visions are distinct from mission statements and goals. Mission statements indicate an organization's purpose; goals focus on shorter-term, outcomes-oriented benchmarks for effecting change (Hill & McShane, 2008; Nanus, 1992; van Knippenberg & Stam, 2014), such as targeted percentages of teachers engaging in particular mathematics practices or targeted rates for student proficiency on standardized assessments. In contrast, a vision might depict the system-wide aspirations for the nature of mathematics teaching and learning, such as classrooms that foster deep engagement and inclusion.

Furthermore, visions are meaningful in both their substance—what they specify as important for instruction, which we detail next—as well as their attributes (Baum et al., 1998; Munter, 2014; Munter & Wilhelm, 2021). On the latter, educational scholarship emphasizes that instructional visions for district

systems should be sufficiently *specific* and aligned with other supports and resources (Cobb & Jackson, 2011; Diliberti et al., 2023; Polikoff et al., 2020).

## B. The Substance of Instructional Visions: Dominant and Critical Axes of Equitable Mathematics

To analyze the substance of districts' instructional visions, we draw on Gutiérrez's (2009, 2011) conception of equitable mathematics as having two central axes: dominant and critical.

### 1. Dominant Axis

The dominant axis of equitable mathematics "reflects the status quo in society" (Gutiérrez 2007, p. 39)—the aspects of mathematics instruction that are valued in dominant discourse and policy. This axis is based on the notion that equity demands that students have access to opportunities for high-quality mathematics and that those opportunities result in improved achievement outcomes (Gutiérrez, 2011). Access includes having high-quality teachers and instructional materials, small class sizes, and supportive classroom environments. Achievement includes performance on standardized tests and other assessments as well as course-taking patterns (Gutiérrez, 2011).

We draw on scholarship in ambitious mathematics to further describe the elements of high-quality instruction that make up the dominant axis.[1] Scholars of ambitious mathematics instruction have highlighted the importance of students' *conceptual understanding and high cognitive demand* along with their procedural fluency (Boaler & Staples, 2008; Cobb & Jackson, 2021; Hill et al., 2018; Lampert et al., 2010; Wilhelm, 2014). These scholars emphasize that teachers ensure students have opportunities to engage in *problem solving, sensemaking, and reasoning* around mathematical concepts and ideas through tasks grounded in *real-world application* (Choppin et al., 2020; Cobb & Jackson, 2021; Hill et al., 2018; Lampert, 1992; Lampert et al., 2010; Munter, 2014; National Mathematics Advisory Panel, 2008). In ambitious instruction, students reason through conceptual and cognitively demanding tasks; teachers facilitate students' *mathematical discourse* by eliciting student ideas, monitoring student conversations with their peers, and building on students' ideas in whole-class discussions (Cobb & Jackson, 2021; Franke et al., 2007; Hill et al., 2018; Lampert et al., 2010; Munter, 2014). Because the literature positions each of these elements of mathematics instruction as central to academically rigorous mathematics, we characterize these elements as part of the dominant axis of equitable mathematics.

### 2. Critical Axis

Importantly, however, Gutiérrez (2011) argues that students must also be prepared to understand and engage in mathematics in a way that challenges traditional power dynamics in mathematics and society more broadly. Gutiérrez's critical axis, then, attends to "the position of students as members of a society rife with issues of power and domination" (2011, p. 40). Using a windows and mirrors metaphor, Gutiérrez argues that mathematics should enable students who have been marginalized to see their identities and

[1] Throughout, we use the terms axis/axes and dimensions as Gutiérrez employed them: axes refer to the dominant and critical axes of her framework; dimensions refer to access and achievement (the dimensions of the dominant axis) and identity and power (the dimensions of the critical axis). We use the term elements to refer to the specific aspects of mathematics instruction that align with either the dominant or critical axes—e.g., conceptual understanding and high cognitive demand.

experiences reflected in the mathematics classroom while also providing students a window into how they or others may have benefited from the status quo. The critical axis also centers power explicitly by emphasizing the importance of using mathematics not just to achieve academically but to understand and engage with social and political issues.

We focus our analysis of the critical axis on a few key elements that align with notions of identity and power. One of these elements is *engaging students' and their communities' funds of knowledge*—i.e., connecting mathematics to students' lives through authentic problem contexts (Aguirre & Zavala, 2013; Amos et al., 2022; Aronson & Laughter, 2016; Morrison et al., 2008; Turner et al., 2012). By connecting to assets of students' cultural identities, instruction can in turn help students in fostering positive *mathematics identities* (Abdulrahim & Orosco, 2020, p. 7; see also Nasir et al., 2008).

The critical axis of equity also entails a shift in the traditional notion of authority, control, and *power in the mathematics classroom*. Such equitable mathematics eschews teacher-directed instruction that privileges transferring teacher expertise to students in favor of instruction that positions students as authoritative voices in the classroom (Gutiérrez, 2009; Munter, 2014)—referred to as "sharing power" in the classroom (Abdulrahim & Orosco, 2020; Morrison et al., 2008). Scholars also demand attention to *empowerment for social justice* in the mathematics classroom (Aguirre & Zavala, 2013; Gutstein, 2006). Mathematics is a tool for understanding, analyzing, and calling attention to issues of equity and social justice: equitable mathematics empowers students to use mathematics to take on social justice issues related to their experiences (Aguirre & Zavala, 2013; Amos et al., 2022; Aronson & Laughter, 2016; Gutstein, 2006).

Finally, scholars of culturally responsive mathematics teaching also speak directly to the importance of incorporating *multilingual learner support and scaffolding* into mathematics instruction—through, for example, using manipulatives and students' first languages (Aguirre & Zavala, 2013). Doing so can support both dominant and critical axes—it ensures multilingual learners have equitable access to mathematics content (Aguirre & Zavala, 2013; Amos et al., 2022; Gutiérrez, 2011; Morrison et al., 2008) and also recognizes and values multilingual learners' identities and funds of knowledge in the classroom.

## C. Infrastructure for Supporting the Vision

Drawing on the coherent instructional systems literature, we posit that supporting instructional visions organization-wide requires consistent messaging about and communication of the vision, as well as supports and structures designed to advance the organization toward the aspirations laid out in vision.

### 1. Consistent Messaging and Communication Around the Vision

Messaging and language play an important role in system-wide instructional improvement and orientation of an organization around a shared vision. In their seminal work on mathematics instructional policy, Cohen and Ball (1999) cautioned against schools receiving "many competing messages" (p. 17) and argued that rapid changes in guidance lead to superficial changes rather than meaningful shifts in practice. This perspective resonates with work that has found consistency and stability in messages, policy, and priorities is important when attempting to support large-scale instructional improvement (Desimone, 2002; Desimone et al., 2017; Stornaiuolo et al., 2023). Park and colleagues (2023) nicely summarize the importance of messaging and language as one piece to a coherent instructional system: "Although the use of language alone may indicate symbolic adoption without actual change in practice, language is still

a critical tool for bridging strategies. Language, in conjunction with other coupling mechanisms like routines and policies, is an important coherence mechanism" (p. 939).

Still, as Park and colleagues (2023) argue, messaging and language alone are insufficient—crafting coherence around a shared vision demands reciprocal and clear communication avenues for conversations between districts and schools that leaders are aware of and empowered to use (Johnson et al., 2014; Rorrer et al., 2008; Srinivasan & Archer, 2018). These lines of communication between schools and the district office are critical for bridging interactions between different policies and resources and for brokering ideas across levels in the system (Honig & Hatch, 2004; Woulfin & Rigby, 2017).

**2. Supports and Structures for Vision**

A system oriented around a shared vision must also create opportunities for leaders and educators to tangibly engage with the instructional vision. Such engagement can be promoted through the incorporation of high-quality curricula, assessments, and PL opportunities that are meaningfully aligned to the vision and supported by district and school leaders (e.g., Cobb et al., 2020; Diliberti et al., 2023; Johnson et al., 2014; Leithwood, 2010). Research speaks to the importance of collaborative and sustained PL opportunities for teachers to discuss and improve instruction, especially when they attempt to craft coherence within and across schools (Cobb & Jackson, 2021; Comstock et al., 2022; Desimone, 2009; Forman et al., 2021). In mathematics instruction, this collaboration can involve PL communities around curriculum (Stein et al., 2007). Such networks require intentional professional support such as coaching and district office support (Cobb & Jackson, 2011; Honig & Rainey, 2023). High-quality and aligned resources—curriculum, instructional materials, and academic guidance documents that complement each other and the vision—support general coherence and instructional and educational improvement efforts (Forman et al., 2021; Polikoff et al., 2020), especially in mathematics instruction (Boston & Wilhelm, 2017; Cobb et al., 2020; Diliberti et al., 2023; Stein et al., 2007).

Importantly, these supports and structures should attend not just to dominant elements of a vision for equitable mathematics, such as conceptual mathematics and problem solving, but also to critical elements, such as what it means to be responsive to students' identities and funds of knowledge in the mathematics classroom (Aguirre & Zavala, 2013; Gutiérrez, 2011; Honig & Rainey, 2023). Furthermore, PL and collaborative learning opportunities should focus not just on the technical aspects of policy implementation, such as how to use curricular tools and resources, but also on the adaptive challenges inherent to equity-oriented instructional change, such as beliefs about students and deep pedagogical understanding (Honig & Hatch, 2004; Pak et al., 2020). Importantly, the circular arrows in Figure 1 indicate that messaging and supports and structures should be mutually reinforcing, supporting coherence across the system.

Grounded in this framework, we focus our study on the nature of instructional visions for equitable mathematics guiding our four districts and the extent to which leaders in these districts describe having in place an infrastructure that might allow them to craft coherence around those visions. Given previous work that has shown a connection between educators' perceptions of their policy environment and their behaviors (e.g., Desimone, 2002), we largely focus on district and school leaders' understandings of and perceptions of their instructional systems (see also Comstock et al., 2022; Stornaiuolo et al., 2023). We

bolster these findings with firsthand observations in one particular district in which district and school leaders expressed relatively consistent visions for equitable mathematics.

# Methods

For this study, we use a multiple case study design to examine the four district visions for equitable mathematics (Yin, 2018). In this section, we describe our methods.

## A. Study Sample

Four large districts were part of the broader study (see Amos et al., 2022) and are included in this substudy. These four districts are geographically distributed across the United States, including eastern, midwestern, and western states. Each brings its own policy, demographic, and instructional contexts (Table 1). District 1 has a much higher percentage of Black/African American students than the other districts, District 2 has a much higher percentage of Hispanic/Latinx students than the others, and District 3 and District 4 are relatively diverse across racial/ethnic groups.

**Table 1.** The Four Cases

| District | Geographic location | Total schools in district | Total schools in sample | Enrollment (K–12) | Mathematics proficiency (SY 2018–2019) | District student demographics |
|---|---|---|---|---|---|---|
| District 1 | Midwest | ~100 | 8 | ~30,000 | Grade 6: 24%<br>Grade 7: 24%<br>Grade 8: 28% | 63.8% Black/African American; 17.4% Hispanic/Latinx; 14.4% White; 1.2% Asian; 3.3% Other Race; 10.2% EL[a] |
| District 2 | West | >100 | 6 | >100,000 | Grade 6: 32%<br>Grade 7: 30%<br>Grade 8: 29% | 7.3% Black/African American; 74% Hispanic/Latinx; 10% White; 5.67% Asian; 3% Other Race; 21.3% EL; 76% FRPL |
| District 3 | East | >100 | 7 | >100,000 | Grade 6: 34%<br>Grade 7: 31%<br>Grade 8: 30% | 24.8% Black/African American; 39.8% Hispanic/Latinx; 16.5% White; 13.8% Asian; 5% Other Race; 13.3% EL; 71.9% students living in poverty |
| District 4 | West | >100 | 14 | ~90,000 | Grade 6: 46%<br>Grade 7: 46%<br>Grade 8: 41% | 7.4% Black/African American; 44.5% Hispanic/Latinx; 23.6% White; 14.4% Asian; 10% Other Race; 19% EL; 55.3% FRPL |

*Note.* District mathematics proficiency data reflect achievement results for state assessments as reported by EdFacts for the 2018–2019 school year, which was the most recent year available of complete data. All other data for Districts 1, 2, and 4 is from Common Core of Data (CCD) from the National Center for Education Statistics (NCES) for the 2021–2022 school year. For District 3, the district did not report on students eligible for free or reduced priced lunch, but the closest relevant indicator was on students living in poverty. That data and rates of English language learners for the 2021-2022 school year were obtained from the district's demographic snapshot through their public data portal. "Other Race" refers to all groups not reflected in the other categories, including American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and two or more races. EL = English language learners; FRPL = free and reduced-price lunch eligibility; SY = school year.

[a] No available free or reduced priced lunch or economic disadvantage data.

To select schools for the study, the broader study team worked with leaders in each district to recruit middle schools (i.e., serving grades 6–8) that were using particular mathematics curricula and were willing

to participate. Mathematics proficiency and eligibility for free and reduced-price lunch rates for participating schools generally reflect comparable district demographics. There are minor differences in student racial/ethnic demographics—in particular, in three of the four districts, our school sample has a lower percentage of Hispanic/Latinx students compared with the district overall.

## B. Data Collection

For this paper, we draw on document collection; 35 semistructured interviews; and, in one district (District 4), 19 PL observations. For document collection, we retrieved public-facing statements on each district's vision for mathematics education from district websites.

In each district, we interviewed district leaders who were centrally involved in middle school mathematics education for the district; we also interviewed school leaders in each participating school (typically the principal, but sometimes including a mathematics coach who played a significant leadership role in the school; Table 2). All interviews were conducted online, lasted approximately one hour, and were recorded and transcribed. We aimed to interview district leaders twice—summer 2022 and winter 2023 (though in one district, we were unable to conduct a second interview). We asked district leaders about the district's vision for high-quality math instruction, how they communicate their vision and engage school leaders around the vision, and the supports provided for leaders and teachers to engage with the central ideas of the vision. We interviewed school leaders in fall 2022. Interview topics included school leaders' sense of the district vision for equitable mathematics instruction, how this relates to their own school-level vision, and the supports for and barriers to enacting the vision.

**Table 2.** Study Participants

| | District leaders | | School leaders | |
|---|---|---|---|---|
| | Total leaders | Total interviews | Total leaders | Total interviews |
| District 1 | 1 | 2 | 9 | 8 |
| District 2 | 2 | 2 | 7 | 6 |
| District 3 | 2 | 2 | 7 | 7 |
| District 4 | 2 | 1 | 14 | 14 |
| Total | 7 | 7 | 37 | 35 |

*Note.* "Total leaders" reflects the total individual leaders involved in interviews. "Total interviews" reflects total conversations (which, in some cases, involved multiple leaders simultaneously). In District 4, two administrators were interviewed together in year 1, and no interviews were conducted in year 2. School administrator participant information reflects interviews conducted in year 2 of data collection (fall/winter of 2022–2023)

We also conducted firsthand observations of 19 PL sessions in District 4; these were led by an external PL provider and focused on middle school teachers who were participating in the broader study. These PL sessions ranged from one to two hours, were focused on particular units from a common curriculum, and were virtually delivered to grade-level teams. The PL provider recorded the sessions and shared the recordings with the research team for coding.

At the time of the study, the team focused its observations only on District 4 because this district and the PL provider recorded their virtual PL sessions and were willing to share the recordings with the research team. Although it would be ideal to have observations from each district, having District 4 PL observations for this paper became particularly valuable as we started analysis, given our findings that District 4 district

and school leaders had the strongest shared vision for mathematics. PL observations, then, offer insights into the extent to which that vision was also concretely supported through PL content in a district that demonstrated promise for orienting around a shared vision for equitable mathematics.

## C. Data Analysis

Analysis proceeded in four phases, during which we used coding cycles, memoing, and analytic matrices (Miles et al., 2014). Phase one focused on understanding the substance and attributes of the district-level visions for equitable mathematics. We operationalized vision statements from the descriptions of the vision for mathematics education on each district's website as well as from verbal descriptions in interviews with district leaders. Using a priori codes from our conceptual framework on the dominant and critical elements of equitable mathematics, we aimed to identify the anchors that grounded district leaders' and documents' descriptions of the focus of the district's attention to mathematics education. We coded district administrator interviews and public documents for the presence of each dominant and critical dimension and how much each element was emphasized. If an element was central in both written statements and district leader descriptions in interviews, we considered it a primary focus; if it was mentioned in only one source, we considered it a secondary focus. We also coded each vision for specificity. We considered visions to be specific if they went beyond naming elements (e.g., cognitive demand) to include explanations of the element. We generated one memo for each district, characterizing the substance and attributes of their visions.

In phase two, we analyzed school leader interview data and generated analytic matrices characterizing each school leader's description of what they see as the district-wide vision for equitable mathematics and comparing their responses to our characterization of the district-level vision. We used this matrix to draw conclusions about what aspects of the vision were shared among district and school leaders and where the visions diverged. In this phase, we determined that, relative to the other three districts, District 4 district and school leaders shared a vision for equitable mathematics, prompting us to attend closely to what distinguished District 4 from the other districts in how the vision was communicated and supported.

In phase three, we focused on understanding each district's infrastructure that supported the enactment of the vision. We analyzed school leaders' interview responses about engagement mechanisms for establishing and communicating school and district visions and the infrastructure to support visions for mathematics instruction. We coded instances of supports and structures for the vision as "dominant" or "critical" to discern the focus of these supports. We created analytic matrices for each district to compare patterns in district–school vision alignment with mechanisms and infrastructure for enacting those visions, allowing us to identify differences across districts in how they communicated and supported engagement around their district-level visions. In particular, we attended to the differences and similarities between District 4 and the other districts. We then used frequency counts of dominant and critical foci to generate visuals of the emphasis on dominant and critical elements in the supports and structures that school leaders described, allowing us to draw conclusions about the extent to which the dominant and critical elements of visions were borne out in supports and structures.

In this phase, we also analyzed our PL observational data from District 4. We used PL data to bolster our self-reported data from leader interviews on the dominant/critical foci of PL. The initial unit of analysis during observations was the activities featured in each session. We identified these based on explicit

evidence of discrete tasks, such as a facilitator's agenda, and on the focus across the different tasks. Observers described each activity and coded it for the nature of the PL focus, aligned with concepts in our conceptual framework, and the degree of that focus. We coded an activity as having a major focus on a particular dimension if it was addressed during most of an activity's time, a minor focus if it was addressed for less than half of the activity time, or mentioned if it was referenced by the PL facilitator but not explicitly part of the activity prompts and/or directions. This coding allowed us to identify patterns in the degree of focus of each PL activity on dominant and critical dimensions. To analyze patterns in these data, we calculated the percentage of activities that focused on each dimension for each PL session. For example, if 2 of 5 activities in a session had a major focus on conceptual mathematics, then 40% of that session's activities had a major focus on conceptual mathematics. We averaged these percentages across all sessions for each dimension and focus level to generate the average percentage of session activities that targeted each dimension. Finally, we categorized each content area coded during the observation as dominant, critical, or both, which allowed us to observe patterns of frequency and degree of focus on dominant and critical elements.

In our final analysis phase, we reviewed our preliminary findings to develop key assertions, discussed these assertions with the project team, and considered disconfirming evidence to ensure trustworthiness of our findings (Maxwell, 2013).

# Findings

Across all districts, the critical elements of equitable mathematics received far less attention in instructional visions and supports and structures for those visions than did dominant elements. We detail our findings in the sections that follow. We describe each district's vision for equitable mathematics at the district level, the messaging and communication around that vision, and the supports and structures in each district that may reinforce the vision.

## A. District and School Visions for Equitable Mathematics

We find that only two districts (District 3 and District 4) covered both dominant and critical elements of equity in their instructional visions. Table 3 shows each district's emphasis on the different dominant and critical elements from our conceptual framework. Figure 2 translates this information into visual form. In only one of our districts (District 4) did school and district leaders share a common vision. We detail these findings in the sections that follow.

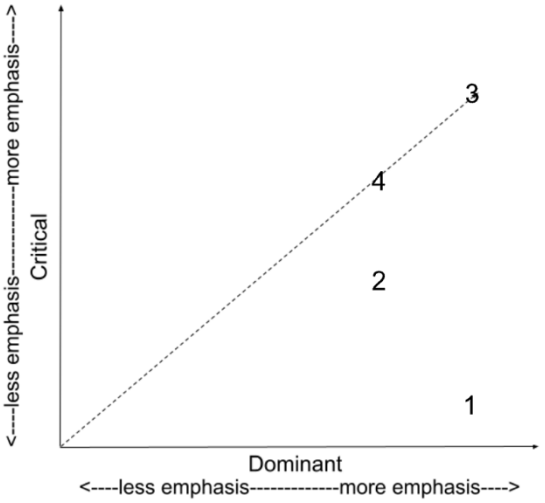
**Table 3.** Vision Content

| Criterion | Definition | District 1 | District 2 | District 3 | District 4 |
|---|---|---|---|---|---|
| **Dominant axis** | | | | | |
| Conceptual mathematics and high cognitive demand | Developing students' conceptual understanding of mathematics through cognitively challenging tasks | ■ | ■ | ■ | ■ |
| Real-world application | Engaging students in application of mathematical ideas to real-world problems and situations | ■ | ■ | ■ | ■ |
| Mathematical problem solving, sensemaking, and reasoning | Engaging students in authentic problem solving, in which students reason with evidence, make sense of mathematical ideas, and consider multiple ways of solving mathematical problems | ■ | ■ | ■ | ■ |
| Mathematical discourse | Facilitating discussion about mathematical concepts in small-group and whole-class settings | ■ | | ■ | ■ |
| Multilingual learner support and scaffolding (dominant and critical)[a] | Attending to the varying language needs of students to support them in engaging in math-related discourse and scaffold their linguistic skills | | ■[b] | ■[b] | |
| **Critical axis** | | | | | |
| Mathematics identity | Supporting students to develop positive beliefs about their own "ability to perform mathematically" (Abdulrahim & Orosco, 2020, p. 7) | | ■ | ■ | ■ |
| Engaging student funds of knowledge | Leveraging students' sociocultural backgrounds, experiences, and home culture to advance understanding of mathematical content | | ■ | ■ | ■ |
| Power in the classroom | Facilitating knowledge co-construction with students, and ensuring students have authority in the classroom | ■ | ■ | ■ | ■ |
| Empowerment for social justice | Identifying, discussing, and analyzing issues of power and social justice to support students' development of critical consciousness | | | ■ | |

*Notes:* Filled circles indicate presence of the indicator in district vision documents as well as interview data. Hollow circles indicate a secondary focus based on inconsistent presence across documents and interviews—e.g., present in interview data (district leader explanations of vision) but not vision documents or vice versa.

[a] Though multilingual learner support and scaffolding, in theory, attends to both the dominant and critical axes, we group this indicator with the criteria for the dominant axis here because the districts that did attend to this indicator did so in a dominant, rather than critical, way. [b] Attention to multilingual learner support and scaffolding was largely communicated as a means for ensuring multilingual learners could access rigorous content, rather than as a means for recognition and inclusivity of students' cultural identities.

**Figure 2.** Emphasis on dominant and critical axes in district visions.




*Note.* This figure represents a visual depiction of the contents of Table 3. The dotted line indicates an equal balance of dominant and critical elements. To construct it, we considered both how many of the dominant and critical elements from Table 3 that each district attended to and to what degree they attended to them (i.e., as a primary or secondary focus—see Table 3). For example, District 3 touched on all elements, though some in a secondary way; as such, we positioned this district far in the top right quadrant, indicating that it had high emphasis on dominant and critical elements (though not complete coverage). 1 = District 1; 2 = District 2; 3 = District 3; 4 = District 4.

## B. District 1

**District Vision: Dominant Focus with Limited Specificity.** District 1's instructional vision centered around academic rigor, aligning with the dominant axis of equity; focused little on critical elements of equity; and had limited specificity.[2] In both the written vision statement and district leader interviews, this district vision focused on mathematical problem solving, mathematical reasoning, communication and collaborative engagement with peers around mathematics. Furthermore, the written vision statement was very focused on standards and achievement, emphasizing the goal of having students "meet and surpass the standards." The only evidence of attention to critical elements appeared in comments from the district leader about shifting the culture of mathematics classrooms such that teachers do not see themselves as "the holder of all knowledge"—aligned with the notion of sharing power in the classroom (Abdulrahim & Orosco, 2020). Overall, District 1's vision lacked specificity. The written vision statement totaled three sentences, and although these focused on critical thinking and problem solving, the description was brief. In interviews, the district leader offered some additional detail—for instance, emphasizing that "all kids [should] have an opportunity to work on complex tasks that are worthy of their productive struggle."

**School Leaders: Two Dominant-Focused Narratives with Limited Specificity.** In District 1, school leaders' instructional visions for mathematics were generally aligned with the emphasis on academic rigor (dominant axis) at the district level, but school leaders took on two distinct narratives when describing their visions. About half of principals shared a focus on aspects of ambitious mathematics, aligning with

[2] For the sake of maintaining anonymity of our districts, we primarily summarize, rather than directly quote, districts' public vision statements.

the district leader's emphasis on "productive struggle," as well as discourse and real-world application. For example, one principal described the importance of "grappling with [a task] and trying to figure out how they would approach this new problem that they have never learned about." The second half of District 1 principals took up the district's focus on standards and achievement, focusing less on the nature of mathematics (e.g., real-world application) and more on standards alignment and outcomes. These principals highlighted a need for differentiation and following curricula with fidelity to ensure student access to high-quality and standards-aligned instruction. As one principal characteristic of this perspective described, "I want to see the kids more engaged in differentiated groups because they are at so many different levels. And so the goal is to try to, we have to expose them to the grade level materials, but somehow we still have to close those gaps as well so the differentiated groups is one way that we can get that done."

Consistent with the district leader interviews and written vision statements, school leaders in District 1 rarely discussed their visions for mathematics instruction as pursuing critical elements of equity. The one critical element of the district vision—sharing power in the classroom—was not present in school leaders' descriptions of their mathematical visions.

## C. District 2

**District Vision: Dominant Focus with a Secondary Critical Focus and Limited Specificity.** The primary emphasis in District 2 was on conceptual understanding and mathematical rigor, which was present across the district's written vision statement and district-level interviews. Like District 1, District 2 strongly emphasized standards and achievement, using language such as "proficiency" and "standards driven" and emphasizing outcomes on standardized tests. In interviews, the district leader also called attention to the importance of providing multilingual learners with "standards-based assignments." In these ways, the district vision attended to both achievement and access in line with the dominant axis of equity.

The critical elements were not addressed in the formal written vision statement, but district leaders touched on them in interviews. For instance, a district leader emphasized that instruction should reflect and validate students' lived experiences. He noted, "We want to make sure the curriculum is, you know, speaking to students of color." He also emphasized the need for students to "see themselves as mathematicians"—an element of fostering mathematical identity among students. District 2's vision also lacked specificity, especially the written vision statement, though was made more concrete in interviews with district leaders. For example, when describing mathematical identity and connecting mathematics to students' lives, a district leader offered the example of a project in which students design a park in their community, adding specificity to his vision of making mathematics relevant to students' lives.

**School Leaders: Varied Dominant Elements.** District 2 school leaders' instructional visions for mathematics varied widely, though they primarily cohered around the dominant elements of equity. The most common thread among school-level visions was real-world applications of mathematics—e.g., one principal described wanting "math to be a practical subject where kids could really make use out of it in real life." Other espoused visions included student perseverance and compliance, problem solving, enjoyment in mathematics, and conceptual understanding.

The district's emphasis on students' lived experiences (a critical indicator) was rarely taken up in principals' descriptions of their visions. When it was, principals discussed student experiences in a way that did not

necessarily reflect the district's goal of embracing students' cultures and identities. For example, one school leader shared the district's focus on achievement and the experiences of students of color but did not describe a vision of instruction that explicitly honors those identities. Emphasizing dominant elements of equitable mathematics, this principal explained, "the focus is on Black students because their scores tend to be lower and sometimes because teachers don't necessarily understand their culture."

## D. District 3[3]

**District Vision: Multifaceted, Specific Integration of Dominant and Critical Elements.** District 3 wove together dominant and critical elements of equity throughout its vision and was the only district with some evidence of all elements across the dominant and critical axes (though not all elements were present in both the written vision and interviews, as shown in Table 3). Notably, several elements were present in the written vision statement but not the district leader interviews, which we attribute to the district recently establishing a very thorough written statement of its instructional vision. Across both sources, the vision attended to real-world connections; collaboration; mathematical discourse; student voice; high expectations; students' sense of belongingness in mathematics; cognitive demand; using mathematics as a tool for community and civic engagement; and, as a district leader shared in interviews, "leverag[ing] students' cultural and linguistic competencies in the mathematics classroom." Because of its expansive focus, we describe District 3 as multifaceted. Furthermore, unlike District 1 and District 2, this vision was also quite specific. For instance, the written vision statement detailed not only the nature of mathematics that students should engage in (e.g., cognitively demanding instruction that is relevant to their lives) but also what that may demand of teachers—for instance, developing a multitiered system of supports for students and to integrate mathematics instructional routines into instruction.

Especially notable was District 3's attention to empowering students for social justice—an indicator present in both the written vision statement and district leader interviews. No other districts emphasized this critical dimension. Both data sources privileged the need to, as one district leader explained, "address issues of power and privilege in mathematics." The district leader also explained a vision of having students "use mathematics as a tool for…making our communities better" in addition to preparing students for college and career.

**School Leaders: Varied With Minimal Attention to Critical Elements.** District 3 principals tended to focus on one element of the district's vision, and these focal elements varied widely among school leaders—perhaps unsurprising, given the breadth and newness of District 3's vision. For example, one principal shared their "vision for math instruction is that our students, number one, see the real-world connection." Another principal emphasized group work and differentiation for students who need additional support. Only one principal emphasized a range of concepts present in the district vision when they explained, "Students are grappling in collaborative learning groups with tasks and being able to talk about their problem solving and their process.... What has been written about most recently with culturally

[3] District 3 underwent changes in its mathematics department and central office leadership during this study, which led to the district putting in place a new, detailed instructional vision for mathematics in the second year of the study. We focus on this new vision for this analysis for two key reasons: (1) we were unable to interview a central office leader overseeing the district as a whole until year 2 and (2) the district's changes were in process during the first year of the study, so the year 2 vision reflected the majority of the thinking and the work in the district at the time of the study.

responsive …education I think goes hand in hand with collaborative work and giving kids voice and opportunities to see relevance and not just procedures without meaning."

Furthermore, despite the District 3 district vision's attention to both critical and dominant elements of equity, school leaders focused less on equity through the critical lens. When they did, they targeted students' social-emotional experiences and representation. For instance, one principal described their vision as "ensuring that students have that joy in learning and are able to tie in their backgrounds. And [know] that their elders were all mathematicians and scientists." Another principal's vision was to create "an environment where students feel attached enough and feel like they belong there where it's safe enough to speak from their perspective of identity." This touches on the district's aim to use cultural competencies but omits attention to other critical elements relating to power and social justice. One principal did reference "the power that's associated with gatekeeping around mathematics" but framed this as an important concept for students to understand to overcome barriers to access rather than disrupting broader systems of oppression.

## E. District 4

**District Vision: Narrow, Specific Integration of Dominant and Critical Elements.** Like District 3, District 4 also wove together elements from the dominant and critical axes, but this district focused on a narrower set of central concepts with specificity. This vision emphasized the development of students' mathematical identities, using mathematics for sensemaking and real-world problem solving, and communicating through mathematical reasoning. The district leader described a holistic vision of math instruction where all students view themselves as mathematicians; where both mathematics and students are seen as "multidimensional"; and where students feel joy, confidence, and a sense of belonging in mathematics classrooms. Also in interviews, the district leader expressed a belief that student voice is "the most powerful mechanism for learning" and aimed to center students as collaborators in learning. This leader explicitly called attention to systemic barriers for marginalized learners to access mathematics, seeing this as a central driver of the mathematics department's emphasis on a multidimensional conception of mathematics. Because of this focus on a narrower set of elements, we characterize District 4's vision as a narrow, specific integration of dominant and critical elements.

**School Leaders: Cohered Around Mathematics Enjoyment, Identity, and Shared Power.** In District 4, school leaders' instructional visions for mathematics were most closely aligned with the core elements of the district vision. The largest shared emphasis among school and district leaders was on fostering positive social-emotional experiences in mathematics and mathematics identity. Characteristic of this pattern was a principal who said, "I'm looking for students to develop a love for math and then really see themselves as mathematicians." Another principal described wanting students "to look forward to [math]." Some principals also linked such experiences to real-world applications of math, such as the leader who reflected, "It's about connecting how math is involved in life and how [math is] not this big scary thing, but a thing that we use all the time and here's how" or another who sought to make math "more relevant, more dynamic." Others made connections to student discourse and collaboration, citing a vision of mathematics instruction where "students are working together. They're communicating, they're solving those math problems together."

School leaders in District 4 also most consistently attended to some critical elements of equity. For example, a common theme among school leaders and the district vision in District 4 was aiming to shift power in the classroom by elevating student voice. This included repositioning teachers as facilitators of learning rather than, as one principal put it, "the old 'sage on the stage' model that we've done for years." For some principals, this emphasis on student voice was framed in a way aligned with the district—as disrupting dominant systems. For example, one principal explicitly attended to elements of instruction beyond students' academic achievement: "I'm also a believer of, sometimes today's not the day. We're not doing math today. We need to have conversations, we need to talk when there's palpable energy in the room." Another principal sought to disrupt the "traditional approach to teaching, of compliance-based teacher talk, 'students listen, raise your hand.'" This principal likened this traditional approach to the "dominant culture of schooling," arguing that it should be disrupted.

Notably, despite relatively consistent emphasis on student voice, some principals discussed student voice in a way that cohered with dominant, rather than critical, elements of equity—most commonly, by characterizing student collaboration and discussion as a way to increase achievement. This finding suggests that even when there is evidence of a shared vision, how principals understand and interpret aspects of that vision can shift its meaning—in this case, reworking a critical dimension of equity to be in service of dominant aims.

## Supporting a Shared Vision

In this section, we turn to the mechanisms each district had in place for supporting a shared understanding of an instructional vision. Given that District 4 district and school leaders tended to cohere around a shared vision, we focus on what sets District 4 apart from the other districts. We find that District 4 district leaders supported that common vision with consistent messaging around the district's mathematics aims. Still, even in that district, opportunities to engage with the critical elements of the instructional vision were largely absent from instructional supports and structures like PL.

### A. Consistent Messaging and Support From District-Level Mathematics Leadership

School leaders in District 4 attributed their mathematics vision to consistent communication from district leadership about the vision. The district-level mathematics lead had a particularly strong influence on school leaders' thinking about equitable mathematics. According to school leaders, the mathematics lead reiterated the vision repeatedly, including at monthly principal meetings, during other PL events like classroom walkthroughs, and through regular newsletters and communications, and garnered significant buy-in among school leaders. As one school leader stated, "The representative at the district level who is in charge of the math work [has] got this contagious happiness about math. Every opportunity [this leader] gets, [they] reminds us of what the district's vision is." Another school leader concurred: "I attend a monthly professional development with the math department from the district. At each meeting they start with the vision and what the end goal is. District staff communicate the vision very frequently with us." Another school leader explained, "Every time [the district mathematics leader] gets involved, that's all she talks about…everything in that [district vision] statement, she hammers, she makes sure that she gives examples." Notably, our PL observation data in District 4 corroborated this pattern—PL sessions often referenced the district vision statement explicitly.

Furthermore, school leaders described the district-level mathematics department's focus on equity as central to their work. One principal explained,

> I've never seen it [diversity, equity, and inclusion] clear and at the forefront of a mission and vision of the district [before]. To have this focus and be so open and clear about it with everyone, every school, everywhere, all the time. It is so prevalent.... The effort is so obvious and it's quite comforting and satisfying...the district is so focused and plain about it, very plain and clear and transparent and there's constant reminders.

This district-level mathematics lead's commitment to the vision was clear across school leader interviews. This district leader had garnered deep respect from school leaders around a clear and concrete shared vision for mathematics rooted in social-emotional learning and equity.

District 4's consistent messaging and influential district leadership was a notable departure from the other three districts. In District 1, school leaders described a focus on a vision during principal PL and through district-shared materials and resources. However, messaging about the vision across these resources emphasized different foci, helping to explain why school leaders were split between describing a vision rooted in productive struggle versus a vision rooted in standardization and achievement. The district used the Principles to Actions book from the National Council of Teachers of Mathematics (2014) as a resource for school leaders. This book identifies eight instructional practices aligned with ambitious and rigorous mathematics. The district also created a document detailing the "profile of a graduate" in their district. Both resources emphasized specific mathematics practices, including productive struggle, aligning with district leaders' emphasis on ensuring students have opportunities "to work on complex tasks that are worthy of their productive struggle." At the same time, the district required all school leaders to complete an academic achievement plan focused on raising students' standardized achievement scores, which many district and school leaders described as the way in which the vision was instantiated in schools. This academic achievement plan helps explain the second half of school leaders, who focused on standardized achievement goals when describing their vision for mathematics. Some principals picked up on this lack of consistent messaging. As one principal explained, "In my opinion, the [vision] is getting lost from the top down."

In District 2 and District 3, school leaders generally described fragmented communication from the district. In both districts, some school leaders noted that the district communicated a vision for mathematics in principal PL and other district communications (e.g., email). In District 3, school leaders described a reliance on different district leaders to communicate with school leaders, which occurred inconsistently. Overall, school leaders in these districts described idiosyncratic communications, signaling no clear or consistent channels for messaging about and engagement with a shared vision.

## B. Inconsistent Supports and Structures for Grappling with the Substance of the Vision

District 4 offers some unique lessons about creating opportunities for leaders and educators to grapple with the substance of the vision. District 4 school leaders described a strong effort from the district mathematics lead to create a range of resources to support this shared vision. As one school leader explained,

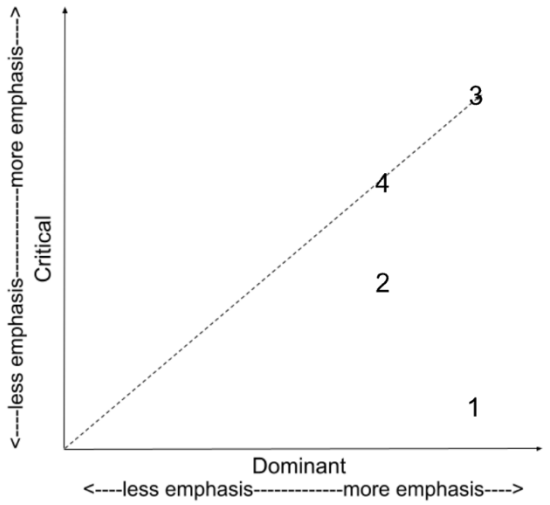
> She's not just talking about it. Her actions are matching her words…She'll make sure that if you need support, she's there for you. She won't back down from hard conversations. And she's got a lot of data and resources that will help support our students.

In particular, to support the district's vision (especially its dominant elements), district leaders undertook a large effort to create a new district formative assessment system that they described as "asset based," "multidimensional," and highly aligned with their vision. The district leadership saw this new assessment system as a way to honor multiple ways of knowing by incorporating open-ended, multiple-solution mathematical problems and building instructional actions based on students' expressed knowledge.

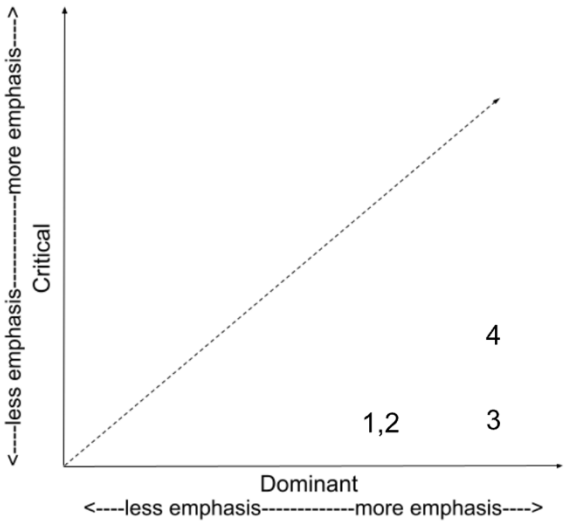
At the same time, evidence also suggested that the supports and structures for mathematics instruction across all districts including District 4 did not offer consistent opportunities to craft coherence around the *critical* elements of visions for equitable mathematics. Figure 3 builds on Figure 2 by depicting a side-by-side representation of each district's emphasis on dominant and critical elements of equitable mathematics in their visions (panel a) and their structures for supporting those visions (panel b), based on school leader interview data.

**Figure 3.** Emphasis on dominant and critical axes in district visions and supports and structures, based on school leader interviews

(a) Emphasis on dominant and critical axes in district visions




(b) Supports and structures for operationalizing vision



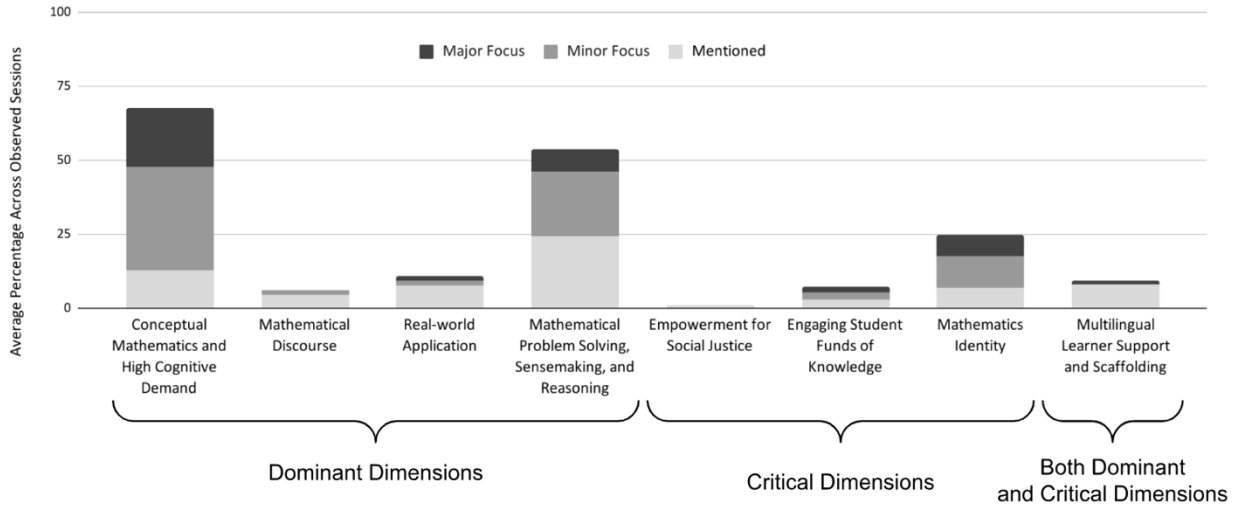

*Note.* Panel (a) is identical to Figure 2 and is repeated here to support the comparison to panel (b). The dotted lines indicate an equal balance of dominant and critical elements. The positioning of districts in panel (b) was based on our coded school leader interview data. We first coded all instances of supports and structures and then identified them as either attending to dominant or critical elements (if possible). We used code counts to then gauge the relative attention to dominant and critical elements. For example, District 4 had some emphasis on critical elements in supports and structures coded data, and strong emphasis on dominant elements. 1 = District 1; 2 = District 2; 2 = District 3; 4 = District 4.

Figure 3(b) shows that only one district—District 4—had a small level of emphasis on the critical elements in their mechanisms (e.g., PL, materials/resources) for supporting the vision, based on school leader reports in interviews about the different resources they could access. Given the lack of emphasis on critical elements in District 1 and District 2, it is perhaps unsurprising that structures for supporting vision in these

districts did not attend to critical elements. However, the findings for District 3 and District 4 are more notable, given that these districts did have a strong emphasis on critical elements in their vision statements. Ultimately, the comparison in panels a and b of Figure 3 suggests that even when districts incorporate critical elements into their visions for equitable mathematics, the emphasis on critical elements is not consistently borne out in the supports, such as PL, for engaging with that vision.

Given that District 4 did emphasize some critical elements in supports and structures, we used PL observational data to dig deeper into whether the content of PL supported the vision (or not). We found that, on average, District 4 PL sessions spent the most time on dominant elements of the vision, especially conceptual mathematics and mathematical problem solving (Figure 4).

**Figure 4.** Average percentage of a given PL session in District 4 that focused on equity elements




*Note.* This figure reflects data from observations of 19 PL sessions in District 4; it represents the average percentage of a given session that focused on each of the elements on the x-axis. Individual PL sessions included two to eight activities. The research team coded the degree to which each activity focused on each of the mathematical elements on the x-axis. Major focus refers to a dimension that was addressed during the majority of an activity. Minor focus refers to a dimension that was addressed for less than half of the activity time. Mentioned refers to a dimension that was referenced by the PL facilitator but was not explicitly part of the activity prompts or directions. For each of the 19 sessions, we calculated the percentage of focus on each dimension on the x-axis. We averaged these percentages across all sessions for each dimension and focus level to generate the percentages depicted in this figure.

Critical elements of the vision, on the other hand, received less focus in PL sessions. In our observations, we found little evidence of engaging student funds of knowledge, multilingual learner support, and empowerment for social justice in PL sessions (though, importantly, the latter was not a focus in this district's vision, so there is no reason to expect to see an emphasis on it in PL). We found more attention to mathematics identity, which reflected District 4's emphasis on this element in their vision. For instance, PL included an ongoing routine in which teachers reflected on how they would support students with diverse identities to cultivate their mathematics identity and experience joy and confidence in mathematics.

In interviews, school leaders described some additional PL focus on critical elements, though often these were general initiatives rather than PL focused on mathematics instruction, or they were ad hoc opportunities spearheaded by individual school leaders for their own school staff. For example, school

leaders described a district initiative to enact restorative circles in schools, which supported relationship building between teachers and students. Though designed to be content agnostic, some principals connected this initiative to supporting cultural responsiveness in mathematics specifically. In addition, some school leaders described ad hoc opportunities to support critical elements of the vision. For example, one principal described a biweekly video series that emphasized different cultural traditions and supported teachers across content areas to engage in conversation with students so that, as she explained, "students feel comfortable discussing their experience [in the classroom] in a real way." However, these PL opportunities focused little on the critical elements of mathematics instruction specifically.

On the whole, although dominant elements seemed to receive time and attention, critical elements of equitable mathematics in district supports and structures were limited across all districts. Even in our focal district, where district and school leaders communicated a similar description of their instructional vision for equitable mathematics that included both dominant and critical elements, the critical equity elements of that vision did not consistently make their way into the district's mathematics-focused structures, routines, and conditions. Ultimately, although District 4 offers positive lessons for crafting coherence, it also represents challenges with centering equity in those efforts.

## Across Districts: Recurring Barriers to Orienting Systems Around Equity-Focused Visions

We observed common themes across districts in the barriers to districts' efforts to orient around equity-focused visions for mathematics, especially the critical elements of those visions.

### A. Competing Demands—Deprioritizing Critical Elements

Resonating with previous scholarship, district and school leaders across all districts echoed concerns about competing demands that challenged their efforts to focus on their mathematics vision, especially elements from the critical axis of equitable mathematics. Competing demands affected every level of the district system—the central office, schools, and classrooms. In some cases, leaders perceived the central office to be more focused on other content areas, such as literacy, than they were on mathematics. As one school leader in District 3 expressed, "Math, unfortunately, has not been on the radar on the district level nor on the citywide level. [The emphasis] is literacy, it's not…math." This lack of focus from top leadership frustrated progress toward mathematics visions. School leaders also described being pulled in many different directions. Many school leaders relied heavily on school-level mathematics coaches to support their mathematics teachers. Other school leaders did not have a leadership team to bolster their capacity to engage their school staff around a shared vision for equitable mathematics.

Across districts, district and school leaders expressed beliefs in the importance of critical elements, such as responsiveness to students' cultures and identities. However, given competing demands, leaders perceived these critical elements of equity to be deprioritized from the top down. As one school leader in District 1 shared, "I haven't had the administrative support that I need to really focus on [cultural responsiveness], to be honest with you. I do know the importance of it, but we haven't gotten there yet." This was true even in our focal district. Despite a strong push in District 4 for resources and supports that helped to operationalize their vision for mathematics, district-level mathematics leaders were critical of

the district's commitment to equity, describing the structure of existing district PL (apart from those that their department organized) as unaligned with the mathematics department's goals. Further, a district leader commented that the district's espoused values regarding cultural responsiveness and anti-racism have not come with the "action, funding, or any commitments or any accountability across our system" to enact true change.

### B. Instability—The Challenge of Relying on Individual Champions of Vision

Leadership turnover also challenged districts' efforts to cohere around a shared vision for equitable mathematics. Two districts—District 2 and District 3—experienced turnover in their superintendents between years one and two of the study. In District 2, district leaders described how the new superintendent restructured the district's mathematics work, noting that PL and supports for schools were now "generated centrally and supported centrally," a stark contrast to how the district previously had been structured. District 3 also experienced a change to its top leadership, which led to the district putting in place a new vision statement about equitable mathematics. These leadership and contextual shifts likely played a role in the fragmented messaging and limited supports that school leaders in these districts experienced.

Although this leadership turnover may bring potentially helpful changes, such as District 3's detailed and expansive vision statement for equitable mathematics, the churn also poses a challenge to school leaders attempting to craft coherence around a shared vision. Leaders in District 3, District 2, and District 1 noted the challenges that leadership turnover posed. As one District 2 school leader commented, "Every time we have a new leader come in, everything is revamped." In District 1, which experienced other central office turnover, a school leader noted, "From the district, [the vision] really hasn't really had a trickle-down effect…. We've had a turnover in [leadership] and district support."

At the time of our study, leaders in District 4 did not report turnover to be a problem for their work toward a vision of equitable mathematics. However, since our study's conclusion, we learned that the district's mathematics lead left the position. Although we have little data to assess the impact of this departure, our data do speak to the important role this leader played in mobilizing educators around a shared vision for equitable mathematics that supported the intersection of dominant and critical mathematics. this departure emphasizes the threat that regular leadership turnover poses to crafting coherence around a shared vision—and the necessity of considering how to institutionalize opportunities for crafting equity-focused coherence even amid leadership turnover.

## Limitations

We focus our study on the extent to which districts have an infrastructure that might make space for crafting coherence around a shared vision and whether that vision is focused on a central conception of equitable mathematics that attends to both dominant and critical elements. Our data do not allow for in-depth examination of the *processes* of crafting coherence in these districts—e.g., *how* school leaders engaged with each other and their staff to develop shared visions. Future work on district visions should examine how districts navigate the tensions that come along with equity-focused work, such as negotiations around what equity is and how to work toward it (Comstock, 2024). Further, although we have rich interview data across our sites, our observational data were limited to just one focal district.

Future studies might focus on collecting data from a range of sources across several districts to bolster the findings we present in this study.

## Discussion

Our findings highlight the challenges with attempting to focus instructional visions on not just the dominant axis of equity but the critical axis as well. By focusing on equity in instructional visions, we make two key contributions to existing conversations about crafting coherent instructional systems. First, we examine how districts attempt to craft coherence around instructional visions—an understudied component of coherent instructional systems. Second, to examine the nature of equitable mathematics that each district focuses on and supports, we draw on a conception of equity that includes both dominant elements, such as ambitious instruction and achievement, and critical elements of cultural identity and power (Gutiérrez, 2011; Roegman et al., 2022). Our study suggests that on the whole, districts focused their visions and supports and structures around the dominant dimensions of access and achievement; critical dimensions received substantially less attention.

### A. Attending to Dominant and Critical Dimensions of Equity

District leaders emphasized dominant features of equitable instruction much more than critical ones. Across all districts, visions focused on dominant elements of equity—in particular, conceptual mathematics and high cognitive demand, real-world application, and mathematical problem solving. The mathematical practices associated with these elements are generally promoted in the literature as important for ensuring students have access to rigorous mathematics experiences (e.g., Choppin et al., 2020; Lampert et al., 2010; Wilhelm, 2014). Furthermore, district leaders often described such practices as serving a key purpose of increasing students' mathematics achievement. The critical dimensions of identity and power received less attention in vision statements as well as in the supports and structures for reinforcing the vision. Two districts—District 1 and District 2—had a very limited focus on critical elements in their visions. District 3 had a strong emphasis on engaging students' funds of knowledge and empowering students to take on issues of social justice, and District 4 had a strong emphasis on developing students' mathematical identities. Across all districts, emphasis on critical dimensions in PL and other supports and structures for reinforcing the vision was limited.

On the one hand, it may be positive that districts seem to be emphasizing a set of practices aligned with literature on rigorous and ambitious mathematics education in both their visions and the supports for those visions. On the other hand, our findings speak to missed opportunities to engage with and support the critical dimensions of equitable mathematics. Scholarship has consistently highlighted the importance of building on students' backgrounds and identities and addressing dimensions of power and social justice through instruction (Abdulrahim & Orosco, 2020; Aguirre & Zavala, 2013; Aronson & Laughter, 2016). Without the attention to critical dimensions, we fail to actually transform instructional systems toward equitable practices.

This lack of attention also represents a missed opportunity for leaders and educators to grapple with the *intersection* of access, achievement, identity, and power. Gutiérrez (2009) emphasizes the need to situate ourselves at this intersection of all four dimensions of equity, as "[b]eing able to name the dimensions helps us move toward highlighting tensions between the dimensions so that we might be more reflective

about how we can successfully balance attending to them all" (p. 6). Attending to this intersection might unearth contradictions among dominant and critical dimensions in practice—for example, how attention to achievement gaps may reinforce deficit narratives about students' identities (Carey, 2014; Comstock, 2024; Gutiérrez et al., 2023). Although Gutiérrez (2009) offers important considerations for classroom-level decisions about equitable mathematics, we argue that positioning education systems in relation to this intersection of both dominant and critical dimensions of equity should not be a responsibility relegated entirely to teachers but also include school and district leaders who are framing and supporting these visions.

A less optimistic read of our findings may be that the critical dimensions of equity—when present—served as "window dressing" within districts' written and described instructional visions without meaningful commitment to those dimensions being provided. However, it is notable that many leaders in these districts still referenced the importance of critical elements, such as culturally responsive practices and social justice teaching. It is also notable that in District 4, we observed some, albeit limited, support of critical dimensions in their PL.

An alternative interpretation, then, is that the emphasis on dominant dimensions reflects the broader institutionalization of access and achievement in policy and practice (e.g., Hodge, 2020; Roegman et al., 2022) and the nascent emphasis of critical dimensions on a broad scale. The institutionalization of access and achievement may pull districts toward a focus on the dominant dimensions of equitable mathematics—for example, if districts already have routines and practices in place for supporting achievement, such as PL and coaching on supporting mathematical discourse, continuing them entails less friction than devising new routines and practices; there are also fewer models to emulate in terms of how to enact and integrate critical dimensions of equitable instruction at this institutional level. The accountability environment may also make it so that district leaders feel they must be laser-focused on access and achievement lest they confront sanctions associated with poor performance. This accountability environment may be the source of some of the competing demands our school leaders described that drew them away from the critical dimensions of visions for equitable mathematics. Furthermore, given their widespread acceptance, access and achievement are often broadly uncontested as important focus areas for mathematics education. Critical dimensions of identity and power, however, are more often politicized and seen as irrelevant for mathematics as a content area (e.g., Parker et al., 2017), further complicating whether and how districts take up these dimensions.

## B. Supporting a Vision in Practice

Our findings also raise questions about what exactly constitutes an "instructional vision" and how to best support it. We oriented our analysis around district-level visions—as reflected in formal written statements and district leader descriptions—because the districts in our sample were attempting to organize around visions defined in this way. However, the absence of supports and structures reinforcing the critical dimensions of districts' vision statements suggests that there may also exist a hidden vision—one that is implicitly communicated through the supports, routines, and practices that the district prioritizes and that may belie formal written statements and pronouncements. These findings raise questions about how best to conceptualize an organizational vision—is it official top-down statements, the ideals implicitly supported through material resources and activities, a ground-up construction? It also raises questions

about how to leverage a vision for instructional improvement in a way that fosters collective aspirations while also giving space for leaders to navigate their complex environments.

We conclude that districts might conceptualize visions as dynamic, rather than static, statements of aspirational goals around which further understanding is crafted as educators work toward that vision. Our findings suggest that consistent messaging can support educators to develop a shared vision and that a district champion, like the mathematics lead in District 4, can promote and mobilize leaders across a district around that vision. At the same time, we also recognize that departures from a district-level vision are part and parcel to the work of school leaders as they engage in bridging and buffering to craft coherence in their widely fragmented environment (Cobb & Smith, 2008; Forman et al., 2021; Honig & Hatch, 2004; Park et al., 2023) and as they continuously make sense of equity as a concept (Comstock, 2024; Howard, 2024). Districts, then, must ensure that leaders and educators have ample opportunities to grapple with the elements of a vision through regular routines, structures, and practices. Indeed, given the contradictions that can arise when attending to both dominant and critical dimensions of equity, such supports and structures may be especially important in helping leaders and educators in unpacking dominant narratives and advancing critical narratives around mathematics teaching and learning (e.g., Gutiérrez et al., 2023). These support structures may also play an important role in promoting institutionalization of an equity-focused instruction vision that can withstand leadership turnover.

## Conclusions

Equity in educational reform efforts is often relegated to an overarching perspective (e.g., using an "equity lens"), focused on enacting technical tools or strategies as opposed to engagement in deeper reflection on cultural practices, and siloed into vision statements without extending into the ongoing work within the system (Dugan, 2021; Howard, 2024). Our findings speak directly to these equity pitfalls and offer important implications for leaders, systems, and policy. Achieving equitable instruction demands opportunities for leaders and educators to envision mathematics that attends to access, achievement, identity, and power and for districts to put in place opportunities for educators to continuously grapple with the intersection of these dimensions. Our findings speak particularly to the need for critical dimensions to be represented in the policy infrastructure—in instructional priorities, supports (e.g., curricular resources and PL), and accountability; how resources are allocated within districts; and the messages we convey to educators and the education system as a whole about equity goals and priorities. At the same time, critical dimensions are not simply additive nor are they addressed through technical fixes alone. They require more than affixing language about students' cultural identities to a vision statement or the purchase of new tools or resources. They demand normative shifts in how the field conceptualizes mathematics education and its purposes, as well as how educators understand issues of identity and power.

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