COLLABORATING FOR EDUCATIONAL IMPROVEMENT: EXPLORING CASES OF TEACHER COLLABORATION FOR POLICY IMPLEMENTATION FROM AN ORGANIZATIONAL PERSPECTIVE

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Teacher collaboration holds great promise for improving educational outcomes. Education policies commonly seek to foster teacher collaboration to bring about improvements in teacher learning, instructional quality, and improved student outcomes. Collaborative approaches including professional learning communities (PLCs), grade level teams, instructional coaching, and co-teaching are common in the reform landscape. Teachers' collaboration is deeply enabled or constrained by school organization and the broader educational systems in which it is embedded. My dissertation studies employ an organizational and systems lens for exploring the embeddedness of teachers' collaboration for policy implementation. Specifically, my studies explore two different policy contexts that utilize collaborative approaches for improvement: the inclusion of students with disabilities and ambitious mathematics instruction. Policies related to inclusion count on teachers' collaboration as a means for ensuring that students with disabilities are appropriately supported in general education settings. With regard to math instruction, schools and districts commonly employ collaborative approaches to enhance teacher professional learning and ultimately enhance the quality of their math instruction. Findings from these studies suggest that using an organizational lens and exploring teachers' practice in terms of

collaboration can reveal important barriers and unintended consequences to collaboration for policy implementation. Together, my dissertation studies illuminate the organizational and social aspects of teacher collaborations for policy implementation that matter if collaboration is to be productive for supporting students in inclusive settings or improving teachers' professional learning for math instruction.

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1.0 INTRODUCTION

Decades of educational research have established the importance of teacher collaboration for improving educational outcomes (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010; Little, 1982; McLaughlin & Talbert, 2001). Teacher collaboration and strong teacher communities have been associated with improved student achievement (Lee & Smith, 1996; Boaler & Staples, 2008; Langer, 2000; Goddard, Goddard, & Tschannen-Moran, 2007; Leana & Pil, 2006; Moolenaar, Sleegers, & Daly, 2012; Pil & Leana, 2009; Siciliano, 2017). Teacher collaboration and strong teacher communities can contribute to teacher learning and professional development (e.g. Horn & Kane, 2015), the building of trust amongst teachers (e.g. Bryk et al. 2010), and contribute to cultures of shared responsibility for student learning or teacher empowerment (e.g. Lee & Smith, 1996).

1.1 PROMISE OF TEACHER COLLABORATION

The potential of teacher collaboration for improving educational outcomes can be unpacked through the concept of social capital. Broadly speaking, social capital refers to the resources that can be drawn from relations between individuals (Adler & Kwon, 2002; Coleman, 1988; Lin, 1999). Social capital theory offers several explanations for how teacher collaboration may lead to improvement. First, individuals can get new information from their collaborations. Second,

individuals may exercise control through their collaborations with others, exerting social pressure on teachers to make desired changes to their practice. Finally, teacher collaborations can foster trust and group solidarity, which can help teachers to feel comfortable taking risks associated with reform and trying new practices.

There is promising evidence to back up the potential of collaborative approaches to fostering social capital for educational improvement. Research has yielded evidence that the mechanisms described above can in fact arise from teacher collaboration and lead to educational improvement. First, collaboration can expose teachers to valuable information and knowledge that can help improve their practice (Cynthia E Coburn, Russell, Kaufman, & Stein, 2012; K. A. Frank et al., 2017; K. A. Frank, Zhao, & Borman, 2004; K. a. Frank, Zhao, Penuel, Ellefson, & Porter, 2011; William R. Penuel, Sun, Frank, & Gallagher, 2012). Second, teachers' collaborations can exert social pressure for teachers to adopt new practices that they have seen their peers adopt (Frank et al., 2004). Third, teacher collaborations and communities characterized by high levels of relational trust are associated with improved teacher practice and educational outcomes (A. S. Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010; A. Bryk & Schneider, 2002).

The types of conversations that teachers have in their collaborations can provide opportunities for professional learning and development (Horn & Little, 2010; Horn & Kane, 2015; Horn et al., 2017; Little, 2002; Popp & Goldman, 2016; Vescio et al., 2008). Teacher collaborative groups can provide a venue through with teachers can "access, conceptualize, and learn from problems of practice" (Horn & Little, 2010, p. 181). In particular, the extent to which teacher communities or workgroups can represent problems of practice in a concrete and specific manner influences teachers' ability to learn and develop from those conversations (Little, 2002).

Having shared frames of reference, such as common curriculum tools or assessments, can help to make conversations more concrete and therefore more likely to contain relevant information about problems of practice (Horn & Little, 2010). The focus of collaborations matters. The focus of meetings determines the types of topics that will be discussed, and some topics more naturally surface issues of conceptual understanding and student learning (Popp & Goldman, 2016). Ultimately, the potential of teachers' learning from collaborations seems to be linked to the extent to which they surface instructional concepts and student learning and attend to them in a specific and concrete manner (Horn & Little, 2010; Little, 2002; Popp & Goldman, 2016).

1.1.1 Teacher collaborations for policy implementation

Teacher collaborations are a critical context for understanding policy implementation (McLaughlin & Talbert, 2001). I argue that teacher collaborative groups are in the complex position of being both the targets and agents of policy implementation efforts (Cohen, 1990). In other words, they are seen as both the problem of what is targeted as needing to change as well as the solution for how such change will be brought about.

First, understanding policy implementation requires understanding the capacity, attitudes, motivations, and beliefs of the individuals who are ultimately tasked with carrying out implementation through their practice (McLaughlin, 1987). Individuals can carry out and even transform policy based on how they interpret policy messages and carry them out in their day-to-day practice (Weatherly & Lipsky, 1977). Individuals' policy interpretation does not happen in isolation; it is a dynamic process that is shaped as messages about policies are framed by school leaders and made sense of in teachers' social interactions (Coburn, 2006; Siciliano et al., 2017; Spillane, Reiser, Gomez, 2006). Thus, teacher communities are an important venue through

which individuals interpret and make sense of policy messages, which influences how their implementation will play out.

In addition to being a venue for interpreting and making sense of policy, schools and districts commonly harness teacher collaborative groups as strategies for carrying out policy demands. Professional learning communities (PLCs), grade level teams, work with instructional coaches, and co-teaching are just a few of the collaborative approaches that have become commonplace in the reform landscape. Schools and districts may instate formal arrangements for collaboration or form groups in which teachers are meant to do the work of policy implementation. For special education policies calling for the inclusion of students with disabilities (SWD) in general education settings, schools rely upon general and special educator collaboration in order to help students access and be successful in the general curriculum. In particular, schools commonly employ co-teaching models in which teachers are formally assigned collaborative partners to plan and teach courses. In response to policy pressures for more ambitious mathematics instruction, schools commonly employ professional learning communities (PLCs) and/or instructional coaches to provide opportunities for teachers' math instructional development.

Despite the prevalence of collaborative approaches to policy implementation, teacher collaboration and the social capital that collaboration can foster are not inherently positive (Adler & Kwon, 2002; Hansen, 1999; Lin, 1999; Reagans & McEvily, 2003). On the contrary, the extent to which teacher collaboration is productive depends upon the surrounding context, level of administrative support, and the substance of the collaboration itself (Horn & Little, 2010; McLaughlin & Talbert, 2001; Hargreaves, 1994; Achinstein, 2002). Policies that require the creation of compulsory teacher communities can lead to "contrived collegiality", as opposed to

communities that are more organic and teacher-driven, which generally does not lead to meaningful or lasting educational change (Hargreaves, 1994). Teacher collaborative communities can also perpetuate traditional ideas of instruction (McLaughlin & Talbert, 2001) and may promote resistance to change if the group norm is to avoid conflict (Achinstein, 2002). In the next section, I briefly describe the role of teacher collaboration in the policy contexts of focus for my dissertation: the inclusion of SWD and ambitious math instruction. Within each policy context, there are gaps in the literature regarding how implementation is shaped by teachers' collaborations. After describing each of these policy contexts, I lay out a conceptual framework for attending to these gaps in the literature by exploring teachers' collaboration for policy implementation from an organizational lens.

1.1.2 Inclusion of students with disabilities

Teacher collaboration has become an essential aspect of supporting SWD in general education settings, broadly referred to as "inclusion" (Fuchs & Fuchs, 1994; McCray, Butler, & Bettini, 2014). Approximately thirteen percent of the public school population qualifies for receiving special education services (U.S. Department of Education, 2016). Policies increasingly promote the inclusion of SWD in general education settings. The Individuals with Disabilities Education Act (IDEA, 2004) requires that SWD be educated in their least restrictive environment (LRE), which refers to the setting closest to the general education setting while still meeting the student's individual needs. The No Child Left Behind Act (NCLB, 2002) and currently the Every Student Succeeds Act (ESSA, 2015) hold schools accountable for the achievement of SWD in grade level standards. Indeed, the percentage of SWD who receive the bulk of their instruction in general education settings has steadily increased over the past few decades, from thirty to almost

sixty percent of students who spend at least eighty percent of their time in general education settings (NCES, 2016).

Effectively instructing SWD in general education settings requires substantive collaboration between general and special educators (Fuchs & Fuchs, 1994). The blending of general and special education expertise is essential for helping SWD to access and succeed in their general education classes (Cook & Friend, 1995; Fuchs & Fuchs, 1994; McLesky, Waldron, & Spooner, 2014). This is especially true at the high school level, where general educators bring specific content area expertise, while special educators have expertise in tailoring instruction to meet SWD unique learning needs.

Perhaps the most popular model for implementing inclusion is "co-teaching", in which special educators and general educators are assigned to collaboratively teach a class that includes both SWD and their general education peers (L. Cook & Friend, 1995). Despite the popularity of co-teaching, evidence of the efficacy of this model is sparse and mixed (B. Cook, McDuffie-Landrum, Oshita, & Cothren Cook, 2011; Murawski & Swanson, 2001). In order for co-teaching to be successful, a number of school-level and teacher-level conditions must be met. At the school-level, administrative support, school culture, and the school schedule should all be aligned with co-teaching. At the teacher-level, compatible teaching philosophies, mutual respect, effective use of planning time, and content training for special educators are all essential (Rivera, Mcmahon, & Keys, 2014).

Despite consensus in the field that educator collaboration is essential for successful inclusion (e.g. Fuchs & Fuchs, 1994; Lipsky & Gartner, 1996; McLeskey, Waldron, Spooner, & Algozzine, 2014), there are substantial gaps in the research base related to collaboration for implementation. Implementation studies have surfaced important organizational conditions that

help to support inclusion (e.g. B. Cook et al., 2011; Scruggs, Mastropieri, & McDuffie, 2007)), but we found no studies that have systematically examined the ways in which collaboration is enabled or constrained by school organization and systems. This type of research is especially needed in high schools, where the organizational structure and norms of teacher autonomy make successful collaboration even more complex (Cole & McLeskey, 1997; Dieker & Murawski, 2003; Schumaker & Deshler, 1988).

1.1.3 Common Core-aligned mathematics instruction

Additionally, teacher collaboration is often harnessed as a means for improving teacher learning with regard to math instruction. Math teachers nationwide must grapple with how to adjust their instruction in order to meet deeper standards of learning that call for more conceptually-focused instruction. The National Council of Teachers of Mathematics (NCTM) initiated the push toward a vision of mathematics as more than just procedural fluency, including an emphasis on reasoning and communication (NCTM, 1989). This has since evolved to a set of mathematical teaching practices including the use of tasks that promote reasoning and problem-solving, facilitate mathematical discourse, and builds upon a foundation of conceptual understanding (Principles to Actions, NCTM, 2014).

The Common Core State Standards for Mathematics (CCSSM) provide some direction for teachers as to how they should shift their instruction to facilitate students' conceptual understanding. The CCSSM outline the content standards and mathematical practices that students should learn in order to be prepared for college and careers in the 21st century. Many states have either adopted the CCSSM or revised their standards of learning to be aligned with the CCSSM. Educators must grapple with how to teach mathematics to help their students

develop a stronger conceptual understanding and problem-solving abilities. For many educators, this may require a fundamental shift in the way they conceive of mathematics and require major changes in their daily instructional practices.

State, district, and school leaders must craft local policy strategies to support teachers in shifting their math instruction in accordance with more ambitious standards. Many efforts to improve teachers' mathematics instruction target their collaboration, including the use of instructional coaches, grade level teams, and PLCs. The popularity of these approaches suggests that they meet the practical needs of schools and districts, but the implementation of these reform efforts tend to be "well-intentioned yet underconceptualized" (Bannister, 2018, p. 130). Part of the reason that collaborative reforms tend to be underconceptualized in practice stems from the "black box" of teacher learning (Bannister, 2018). Teacher learning is often presumed to arise from teacher collaborations, but research understanding how teacher learning plays out in the context of communities or the conditions that bring it about are still developing (Horn & Kane, 2015; Horn & Little, 2010; Little, 2002; Popp & Goldman, 2016; van Es, 2012). Researchers have begun to unpack this "black box" by examining the nature of teachers' conversations about math teaching in collaborative workgroups (e.g. Coburn & Russell, 2008; Coburn et al., 2012; Horn & Kane, 2015), but there is considerable need for research that examines how school organization and the availability of resources enable or constrain teachers' opportunities for learning in collaborative groups.

1.1.4 Organizational perspective on collaboration

In both of these policy contexts, attending to the dynamics of teacher collaboration and how they are embedded in broader school and district systems is crucial for understanding their potential

for policy implementation. The dynamics of teacher collaboration are enabled and constrained by the broader school and district systems in which they are embedded (McLaughlin & Talbert, 2001). Organizational theorists have made significant contributions to further the understanding of how broader systems in which individuals are embedded shape their actions and interactions (Bidwell, 2001; Coburn, 2004; Little 1982; McLaughlin, 1987). Applying this perspective to education, research has surfaced several aspects of school and district organization that seem to be especially salient for shaping teacher collaborations. First, leadership plays an important role shaping messages about reform and conveying support for teacher collaboration (C. E. Coburn, 2006; Datnow, 2011). Second, the design of collaborative efforts has important implications for the nature of teacher collaboration and extent to which it may be fruitful (Cynthia E Coburn, Mata, & Choi, 2013; Cynthia E Coburn & Russell, 2008; W R Penuel, Riel, Krause, & Frank, 2009). Leaders play a substantial role in designing collaborative efforts. For instance, district leaders may make decisions in hiring instructional coaches and crafting the role that they will play in supporting teachers' instruction. School leaders may design certain routines for teachers to follow in PLCs. Third, the relationships and culture amongst teachers in a school has powerful implications for the success of their collaboration (Atteberry & Bryk, 2010; A. S. Bryk et al., 2010; A. Bryk & Schneider, 2002; Daly, Moolenaar, Bolivar, & Burke, 2010; Finnigan & Daly, 2012). In the next section, I present a framework for exploring teachers' collaboration for policy implementation as embedded within broader school systems.

1.2 CONCEPTUAL FRAMEWORK

Exploring the extent to which policies targeting collaboration may be successful in improving practice requires attention to collaboration as it is embedded in the organization of school systems (McLaughlin & Talbert, 2001; Spillane, Gomez, & Mesler, 2009). My dissertation studies share three broad conceptual threads, adapted from Spillane, Gomez, and Mesler's conception of the role of organizations in policy implementation (2009). The three broad conceptual threads of my framework are depicted in Figure 1 and include: (1) conceptualizing organizational structure as resources, (2) conceptualizing practice as constituted in interactions, and (3) connecting the macro (i.e. organizational and policy influences) and micro (i.e. teachers' interactions).

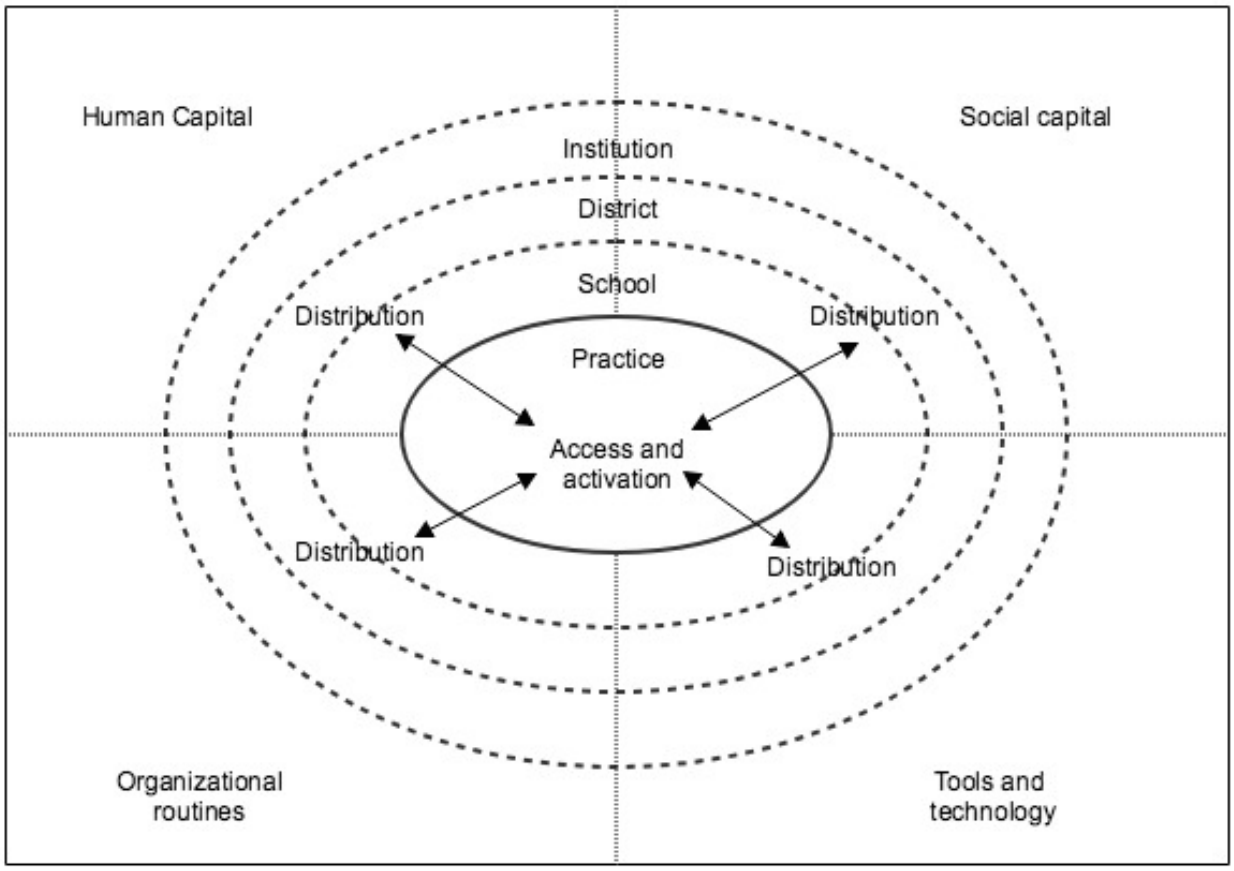

Figure 1. Exploring teachers' collaboration for policy implementation through the distribution, access, and activation of organizational resources

1.2.1 Organizational structure as resources

While policies provide broad directives, the challenge of policy implementation falls to schools and districts. Therefore, these local organizations play a critical role in shaping policy implementation (Spillane et al., 2009). Attending to the structure of organizations is essential for understanding how collaborative efforts for improvement may be enabled or constrained. Spillane and colleagues argue for thinking about how schools and school systems organize by examining their construction and allocation of key resources. There are four organizational resources that enable and constrain educators' interactions and ultimately their implementation

of policies through their collaborative efforts: human capital, social capital, organizational routines, and tools and technology. Human capital refers to the knowledge, skill, and expertise of individuals in an organization (Coleman, 1988). Social capital refers to the resources embedded in the relations amongst individuals, such as trust (Lin, 1999). Organizational routines are repeated and predictable patterns of interaction that enabled efficient, coordinated work in organizations (Feldman & Pentland, 2003). Lastly, technology and tools structure interactions and are often utilized to try and streamline organizational work (e.g. email, instructional or administrative software).

By conceptualizing organizational structure as resources, we understand that organizational structure is not fixed but instead is dynamic. In order to understand how collaboration will be shaped by policy and in turn shape implementation, it is necessary to attend to the ostensive and performative aspects of each resource (Spillane et al., 2009). The ostensive aspect is the resource as formally designed. The performative aspect involves what people actually do with the resource in particular times and places (Feldman & Pentland, 2003). The ostensive aspect of these resources is generally embodied in policy, which determines how the resources will be manipulated and distributed. At the same time, the performative aspect of these resources reveals how implementation plays out in practice. It is essential to bear in mind both aspects of resources in order to understand policy implementation. They are not equivalent, yet each aspect shapes and is shaped by the other (Spillane et al., 2009).

1.2.2 Practice as interaction

Another unifying theme of my dissertation is the broad conceptualization of practice. Spillane and colleagues define practice as “patterns of behavior that emerge from people’s interactions

with each other as mediated by aspects of the situation (i.e. resources) over time" (p. 414). By this definition, practice is enabled and constrained by organizational resources. While organizational resources shape and can provide a "tool kit" for practice, they are also shaped by practice. In other words, organizational resources have ostensive aspects that provide broad rules and structures for practice, but individuals' day-to-day practice (i.e. the performative aspect) also shapes organizational resources (Spillane et al., 2009).

For example, a school district may utilize instructional coaches, a human capital resource, to support teachers in adjusting their literacy instruction to meet the demands of a new reform. The coach's formal role and responsibilities, as laid out by the district, represent the ostensive aspect of that resource. Practice unfolds as the coach interacts with teachers and leaders over time. Teachers may develop a strong and trusting bond with the coach and perhaps even seek their input on managing student behavior during literacy lessons. In practice, the coach may also become seen as a de facto behavior management guru. Thus, the formal role of the coach shaped practice by providing an expert for teachers to engage with about their literacy instruction. In turn, teachers' interactions with the coach shaped the resource of coaching in the school.

This broad conceptualization of practice as interaction, shaped by and shaping organizational resources, is a valuable lens for understanding policy implementation efforts that leverage teachers' collaboration. With policy and reform efforts increasingly utilizing collaborative approaches, it no longer makes sense to limit our conceptualization of practice to what takes place inside classroom doors. Furthermore, this framework accounts for the embeddedness of teacher collaborations in schools and broader school systems and the ways in which that embeddedness influences collaboration.

1.2.3 Connecting the macro and micro

The third unifying theme of my conceptual framework is the importance of connecting macro and micro-level features when examining policy implementation. Just as a true understanding of practice extends beyond the classroom, implementation extends beyond one organizational level (e.g. classroom, school, district, broader school system, institutions etc.). Instead, we can conceptualize the role of local organizations in policy implementation by attending to how organizational resources are distributed, accessed, and activated in practice (Spillane et al., 2009). In other words, resources must first be made available (i.e. distributed), then recognized as useful (i.e. accessed), and ultimately utilized for a specific purpose (i.e. activated).

Altogether, these three overarching themes provide a frame for tracing the relationship between the macro and micro levels that influence policy implementation. Organizational resources and practice are not confined to one organizational level. Examining resource distribution, access, and activation provides a frame for considering organizational structure and practice at the same time, as they stretch across organizational levels (Spillane et al., 2009). For instance, districts may craft local policies that determine how resources will be distributed to schools. These policies represent the ostensive aspects of resources. The way in which schools utilize these resources determines the extent to which teachers can access them. Finally, we can examine the extent to which teachers activate organizational resources through their interactions with others, which represents the performative aspect of resources.

1.2.4 Applying the framework to dissertation studies

Anchored in this framework, the three papers in my dissertation explore issues of teachers' collaboration for policy implementation. Papers 1 and 2 attend to the organizational structures that enable or constrain teachers' collaborations to include SWD in high schools. Paper 1 compares two high schools with different formal structures and models for inclusion, and examines how these structures enable or constrain teachers' collaborative work to support SWD in the form of organizational routines. Paper 2 provides a broader perspective of the formal structures that shape teachers' work in inclusive schools. Using a lens of complex systems, we explore the interrelated elements that support inclusion in the school as well as the goals and pressures that shape the school system. Paper 3 explores the relationship between the distribution of organizational supports for collaboration and teachers' access and activation of resources for professional learning in their collaborations related to math instruction. The organizational thread connecting these papers reveals novel insights about the ways in which macro-influences such as policy, organizational structures, and systems relate to teachers' day-to-day interactions and policy implementation.

2.0 PAPER 1:

ORGANIZING FOR INCLUSION: EXPLORING THE ROUTINES THAT SHAPE STUDENT SUPPORTS

The inclusion movement increasingly calls for students with disabilities to be educated in general education settings, but little is known about how school organizational conditions influence implementation. With a comparative case study of two high schools, we aim to generate a mid-level theory of inclusion, linking broad policy pressures, school organizational structures, and teacher practice. In each school, we found a dominant routine that coordinated educators' actions to support students with disabilities in general education settings. The routines allowed special educators to boost student grades despite their limited opportunities to provide specialized instruction. Examining inclusion through an organizational lens illuminates the factors that enable or constrain teacher practice as well as implications for how students with disabilities are supported.

2.1 INTRODUCTION

Approximately thirteen percent of the public school aged population qualifies for receiving special education services, and these students increasingly receive the bulk of their instruction in general education settings. Broadly referred to as "inclusion", researchers and advocates have

highlighted many potential benefits of inclusive instruction including helping students with disabilities (SWD) to achieve college and career ready standards (Jorgensen, McSheehan, Schuh, & Sonnenmeier, 2012) possibly reducing the number of students requiring special education (Ashby, 2012), and even has social benefits for non-disabled peers.

Though the concept of inclusion has expanded to cover those with differences in language, culture, gender, and socioeconomic status who may require different instructional strategies to meet learning and behavioral needs, it was originally conceptualized to reduce segregation between general and special education (Obiakor, 2016). Spurred by advocates speaking out against the segregation of SWD (e.g. Deno, 1970; Dunn, 1968), the landmark special education legislation the Education for All Handicapped Children Act was passed in 1975 and laid the groundwork for current special education practice. A next wave of advocacy pushed for even more inclusive education for SWD, arguing that pulling them out of general education classes could be detrimental to their learning (e.g. Gartner & Lipsky, 1987; Will, 1986), and that special educators should collaborate with general educators to provide specialized instruction inside the general classroom (Stainback, Stainback, Courtnage, & Jaben, 1985). Currently, special education federal law (the Individuals with Disabilities Education Act, 2004) and accountability policies (No Child Left Behind Act, 2001; Every Student Succeeds Act, 2015) have spurred the movement toward more SWD being fully included in general education settings by holding schools accountable for SWD performance in the same grade level general education standards as their peers.

Where SWD are educated and whether or not they have access to general education settings has been the focus of much debate and advocacy. However, the current special education climate calls for attending to the *quality* of instruction that SWD receive in general settings and

the extent to which they are afforded equitable learning opportunities (Zigmond, Kloo, & Volonino, 2009). An equitable education requires not only equal *access* but also equitable *benefit* from those learning opportunities (McLaughlin, 2010).

Schools are increasingly providing students with high incidence disabilities more equitable access to the general education curriculum[2], but many still struggle to attain more equitable achievement outcomes as evidenced by persistent gaps in achievement between students with and without disabilities (e.g. National Assessment of Educational Progress, 1992 – 2015). Kauffman, Anastasiou, and Maag (2017) argue, "The improvement of special education does not depend only on more inclusion or integration of special education and general education but on the improvement of instruction for students with disabilities in all of the various environments in which special education is practiced" (p. 142). A recent Supreme Court case bolsters this sentiment and pushes the notion of what is considered "equitable", ruling that SWD should have the opportunity to meet challenging objectives and make more than just minimal progress in the general education curriculum (Endrew F. v. Douglas County School District).

How can schools achieve this vision of equitable inclusion for SWD? Research offers some insight into potential "best practices" from schools that are successfully inclusive (Mcleskey, Waldron, & Redd, 2014a; McLeskey, Waldron, Spooner, & Algozzine, 2014b). Staff in effective, inclusive schools assume collective responsibility for the success of all students, including SWD. Special educators help to provide high quality instruction for SWD inside general education classrooms. Teachers receive ongoing, job-embedded support and act as a learning community to better understand how to support SWD. Finally, school operations such as teacher schedules are carefully managed to ensure that special educators have time allotted to support general education classes and to plan collaboratively with general educators (Bettini et

al., 2016). Researchers have found that schools with these conditions in place can provide truly equitable support to SWD (Mcleskey et al., 2014a).

Despite the strong promise of inclusion, educators face challenges to implementing inclusive special education practice that stem from the organizational level. Successful inclusion requires school-wide organizational and cultural shifts to enable productive collaboration between general and special educators (Fuchs & Fuchs, 1994; Lipsky & Gartner, 1996). Existing organizational norms and structures can make these shifts difficult, particularly at the high school level, where teaching and learning are traditionally more isolated by classroom and segmented by department (McLaughlin & Talbert, 2001). High school general educators typically bring content area expertise, while special educators specialize in understanding the unique learning needs of SWD and how to tailor curriculum and instruction accordingly. Without their productive collaboration and blending of expertise, it would be challenging to appropriately support SWD in general education classrooms. Organizational features such as school schedules and the allocation of teachers' time pose significant challenges for special educators as the students they support are spread across the school and they must find ways to collaborate across organizational boundaries such as grade level and content area (Murawski & Dieker, 2003).

While the implementation of inclusion has been widely documented at the classroom level (Harbort et al., 2007; Magiera & Zigmond, 2005; Mastropieri et al., 2005; Rivera et al., 2014; Scruggs et al., 2007), we argue that successful implementation is largely dependent on school organization and the extent to which it enables productive collaboration. Therefore, we apply an organizational perspective to understand how implementation plays out across the school and in the collaboration between educators. Utilizing an organizational perspective to explore special education policy implementation has revealed important and novel insights about

the importance of organizational boundary spanning (e.g. Scanlan, 2009) and unintended consequences for implementation when educators prioritize between multiple demands (e.g. Weatherly & Lipsky, 1977).

We employ an organizational framework, exploring how two high schools implement inclusion by identifying the organizational routines that emerge in teachers' day-to-day work. Defined as repetitive, recognizable patterns of interdependent action stretched across multiple people (Feldman & Pentland, 2003), organizational routines describe the way that collaborative work is accomplished in organizations. The lens of organizational routines is both novel and potentially illuminating for understanding the implementation of inclusive special education practices in high schools, where special educators' work is inherently collaborative and spread across organizational boundaries. This study explores the organizational routines that emerged as high school special educators strive to support students with disabilities in inclusive settings.

2.2 CONCEPTUAL FRAMEWORK

Through our case study we aim to contribute to a mid-level theory that provides insight into the link between the broad policy context promoting inclusion, teacher practice, and supports for students with disabilities. School organizational structures, both formal and informal, provide a mid-level bridge between the macro-level forces that shape inclusion and the micro-level enactments of inclusion in teachers' day-to-day practice. In the following section we present our conceptual framework (see Figure 2). We theorize that organizational structures shape the routine practices of educators. Routines direct teacher practice, including their interactions with colleagues, and ultimately shape the quality of supports that students receive.

2.2.1 Institutional demands for inclusion

Special education policies and the related practices enacted in schools constitute an institution in the sociological sense (Bray & Russell, 2016; McDermott, 2001). Barley and Tolbert (1997) define institutions as the "shared rules and typifications that identify categories of social actors and their appropriate activities or relationships" (p. 96). Institutions provide a broad script for action for the organizations or individuals that they influence (Barley & Tolbert, 1997; Burch, 2007; Meyer & Rowan, 1978; Scott, 2001), which are perpetuated by formal regulation and normative pressure from professionals in organizations (DiMaggio & Powell, 1983; Scott, 2001). Institutional logics, or the belief system common in a given field, may shift as a result of changing regulative and normative pressures (Alford & Friedland, 1985; Lounsbury & Pollack, 2001; Author, 2011). Special education has been historically dominated by an institutional logic emphasizing *individualization*. In recent decades, however, the institutional logic has shifted to one of *inclusion* (Authors, 2013). Special education policies began holding educators accountable for students with disabilities' performance on general education standards (e.g. NCLB, 2001; IDEA, 2004) and normative pressures began calling for inclusion as a moral and civil right (e.g. Lipsky & Gartner, 1996; Stainback & Stainback, 1984; J. S. Thousand & Villa, 1995).

Organizations seek to align their structures- defined as the ways in which their material, human and social resources are organized- with the prevailing institutional logic (Powell & Colyvas, 2008). Schools are particularly prone to align their formal structures to institutional norms in order to appear "legitimate" (Meyer & Rowan, 1978). Trends in special education suggest that schools are aligning their formal structures with the inclusion logic. For instance, teacher roles and teaching assignments constitute a formal organizational structure that has

undergone a shift; as schools increasingly recast the role of special educators as consultants or co-teachers (Brownell et al., 2010; Cook et al., 2011; Cook & Friend, 1995; Epler & Ross, 2014). While schools may shift their formal organizational structures to align with the prevailing institutional norm of inclusion, institutional theory suggests that such shifts may or may not bring significant change to the core work of schools: teaching and learning (Meyer & Rowan, 1978; Weick, 1982), as organizations exhibit discretion is crafting unique and strategic responses to such pressures (Goodrick & Salancik, 1996; Oliver, 1991). Formal organizational structures and teaching and learning may only be "loosely coupled", shielding the work of schools from having to undergo significant change in practice as institutional pressures shift (Weick, 1995). Indeed, studies have revealed that even within schools that appear to be successfully "doing inclusion" based on their formal structures, teaching and learning may not be truly inclusive as special educators play a minimal role in teaching and students do not receive specialized supports (Magiera, Smith, Zigmond, & Gebauer, 2005; Zigmond & Matta, 2004).

Our mid-level theory posits that formal organizational structures are only part of a school's response to pressures for inclusion. Informal structures, such as teachers' work routines and patterns of interaction, reveal how teachers exert their agency as they grapple with the pressures for inclusion within the bounds of a school's formal structures. Informal structures tell us more about the extent to which school responses to inclusion change the substance of teacher practice and whether or not students are afforded more equitable opportunities as a result.

2.2.2 Organizational routines for inclusion

We utilize organizational routines as a conceptual and analytic lens for understanding the informal structures of inclusive high schools. Defined as repetitive, recognizable patterns of

interdependent action stretched across multiple people (Feldman & Pentland, 2003), routines are central to the way work is performed in organizations (Feldman & Pentland, 2003; Cyert & March, 1963; March & Simon, 1958). Routines provide a mechanism for coordinating work among people stretched across time and space (Cyert & March, 1963; March & Simon, 1958; Nelson & Winter, 2009). Routines also help to stabilize practice, ensuring that critical work functions are enacted reliably over time (Nelson, 1994; Coombs & Metcalfe, 2002).

We hypothesize that routines are critical to the effective execution of secondary special education inclusion programs, which require regular coordination and collaboration across educators from different school subunits (e.g. role groups, content areas, grade levels). In order to meet the demands of inclusion, districts and schools establish standard procedures for action (i.e. routines) that become a part of the school's informal structure. For example, multi-disciplinary teams including special educators, general educators, specialists, and parents engage in annual routines related to the creation and review of students' Individualized Education Programs (IEPs) (Bray & Russell, 2016). In addition, schools may develop routines whereby special educators regularly co-teach or consult with general education teachers. These types of routines are likely to emerge as schools attempt to align their practices with the institutional logic of inclusion. Organizational routines highlight the interplay between formal organizational structures and individual agency (Feldman & Pentland, 2003; Spillane et al., 2011). While formal organizational structures provide broad guidance for educator action, educators enact agency as they improvise to meet challenges they encounter when implementing inclusion at the high school level.

2.2.3 Teacher interaction networks

Social network methodologies provide a productive lens for exploring organizational routines and other informal interactions among teachers. Borgatti, Everett, and Johnson (2013) define social networks as "a way of thinking about social systems that focus our attention on the relationships among the entities that make up the system" (p. 1). If we conceive of routines as being implemented within a broader school network, network research methodologies allow us to systematically measure and explore the way that resources and expertise are activated through routine interactions (Lin, 1999).

Research using social network analysis shows how the structure and composition of teachers' networks has ramifications for their collaborative work, and even their practice (e.g. A, Coburn et al., 2012; Frank, Zhao, & Borman, 2004; Penuel et al., 2009). Denser social networks – defined as networks with more connections among members (Borgatti, Everett, & Johnson, 2013) – can facilitate the formation of trust, the development of norms, and willingness to share sensitive information (Coleman, 1988; Hansen, 1999b). Denser network structures are also associated with teachers' sense of collective efficacy in supporting students (Nienke M. Moolenaar et al., 2012).[3] In highly centralized networks, where many network connections are with a few central actors – these central members have greater control over the flow of information, knowledge, and resources. Highly centralized networks can facilitate the dissemination of knowledge from more central members (Cummings & Cross, 2003). We expect that density and centralization will have implications for how schools implement inclusion. Schools with more dense social networks may better equipped to develop shared norms around inclusion and exert social pressure encouraging teachers to assume collective responsibility for the success of all students (Adler & Kwon, 2002; Coleman, 1988; Lin, 1999) A highly

centralized network could either facilitate or hinder inclusion, depending upon the nature of the information that highly centralized members share.

2.2.4 Contributions of a mid-level theory

Our emphasis on formal and informal school structures, employing the concepts of organizational routines and teacher networks, provides much-needed insight into the mechanisms whereby institutional demands of inclusion shape teacher practice and student supports. Previous research in special education tends to emphasize school conditions more broadly (Brownell et al., 2010; Mcleskey et al., 2014a) or teacher practice specifically (Mastropieri et al., 2005; McDuffie, Mastropieri, & Scruggs, 2009; Wasburn-Moses, 2005; Weiss & Lloyd, 2002). We have found few studies attempting to theorize a link between the two (e.g. Weatherley & Lipsky, 1977).

2.3 METHODS

2.3.1 Background and context

Our study compares the implementation of inclusion in two high schools: Willow and Elm. Data for this investigation was collected as part of a broader exploratory study seeking to gain a better understanding of the implementation of special education policies and teacher roles, and practices in inclusive settings. We originally selected Willow High School, which had been recognized by the state for having positive inclusive practices (i.e. a high proportion of students

with disabilities received instruction in the general education setting). After spending a year intensively collecting data in the school, we observed that Willow's consultation model was falling short of adequately supporting students and that teachers felt strained in their roles. This led us to seek another case with a different model for supporting students with disabilities to contrast. We selected Elm at the recommendation of local professional development providers, who attested that the district had a successful co-teaching model. We spent another year collecting the same type of data in Elm to allow us to contrast these cases.

Our sampling presents a unique opportunity to explore how implementation unfolds in two high schools facing similar pressures as they strive to include students with disabilities while utilizing different models for delivering services to students with disabilities (i.e. service delivery models). Both schools were facing sanctions as a result of not having made adequate yearly progress (AYP) on state accountability assessments, with Willow in corrective action for failing to make AYP for the past three years and Elm in warning status for failing to make AYP for the past two years.[3] Located in the state of Pennsylvania, both schools faced pressure from a statewide legal settlement requiring stronger district-level monitoring of the rate at which students with disabilities are included in general education settings (Gaskin v. Commonwealth, 2005).

Willow and Elm school districts served relatively similar populations of students with disabilities, with the majority of students classified as having high-incidence disabilities including specific learning disabilities (37 and 42 percent respectively) or speech and language impairments (19 and 16 percent respectively). Table 1 summarizes the breakdown of disability types present in each district.

Both high schools endeavored to include students in general education settings as much as possible. Willow and Elm school districts reported that, respectively, approximately 78 and 82 percent of students with disabilities in the schools received 80 percent of more of their instruction in general education settings, which surpassed the state average of 58 percent. However, neither school fully included all students with disabilities in general education settings. Willow had a "life skills program" in which students who they felt would not be successful due to academic and/or behavioral needs spent part or all of their day in a special education setting within the school taught by special educators referred to as "life skills teachers". Elm high school previously had separate resource rooms and life skills classes, but those classes were eliminated in an effort to more fully include all students with disabilities. However, Elm did place some students with disabilities in more intensive special education programs outside of the district.

For the majority of students with disabilities who were fully included in general education settings, Willow and Elm used different service delivery models. Willow identified as primarily using a consultation model, in which special educators acted as consultants to general educators around the needs of students with disabilities. Elm identified as using a co-teaching model, in which general and special educators are assigned to "co-teach" general education classes.

While both schools were originally recommended to the researchers for exemplifying successful inclusion by some metric, the motivation for this case study is not to highlight their positive practices or to arrive at recommendations about models for high school inclusion. Instead, these schools provide compelling cases for understanding how high schools organize their resources to implement inclusion as they grapple with similar policy pressures, without the infusion of extra resources or support from researchers.

Our comparative case study of these schools surfaced the ways in which schools grappled with pressures related to inclusion without the infusion of extra resources or support.

Our study of Willow and Elm was guided by the following research questions:

1. How do the co-teaching and consultation service delivery models interact with formal organizational structures in Willow and Elm?
2. How do organizational routines for inclusion provide informal structures for the enactment of co-teaching and consultation?
3. What are the implications of Willow and Elm's organizational routines for student support?

2.3.2 Participants

The schools in this case study differ by size, with Willow enrolling 1500 students compared to Elm enrolling 555 students. Approximately 50 percent of the students at Willow qualified for Free and Reduced Lunch, compared to 41 percent at Elm. Both schools serve populations of primarily white students (51 percent of Willow's population compared to 80 percent in Elm).

We interviewed a sample of general educators, administrators, assistants, and counselors who regularly worked with students with disabilities and were willing to participate. All special educators centrally involved with the inclusion program (i.e. not teaching self-contained courses or having solely administrative tasks) were also interviewed. This included 5 special educators at Willow, compared to 4 at Elm.[4] While one special educator at Willow is male, the remaining 8 special educators are female. Special educators in both schools had a substantial amount of teaching experience, with a mean of 21 years of teaching experience at Willow and 23 years of teaching experience at Elm.

2.3.3 Data sources

We collected multiple sources of data over the course of two years while developing rich descriptions of the inclusion programs in each school, including interviews, shadowing, and a social network survey (summarized in Table 2).

2.3.3.1 Interviews

We first conducted semi-structured interviews in order to understand each school's model for inclusion as well as to get a sense of the organizational routines each school used to enact inclusion. We began by interviewing special education teachers and school and district leaders to explore how inclusion works in each school. These initial interviews helped us to identify other key staff members including administrators, assistants, and counselors who played an important role in supporting students with disabilities in their schools (see Table 2). The interview protocol was designed to understand the interviewees' views and opinions of inclusion, how inclusion works in their school, conceptions of their role in implementing inclusion, ongoing work and interactions with others related to inclusion, and school-wide supports or barriers to inclusionary practices. We interviewed some staff members a second time to follow up on emergent themes and to check our interpretation. Specifically, staff members spoke of several prominent practices that special educators used to coordinate support for students with disabilities.

2.3.3.2 Observations

After conducting the interviews, we shadowed two special educators in each school in order to understand how they implemented these practices and the extent to which they were routinized in their day-to-day work. We selected special educators who showed enthusiasm about participating

in the study and whose schedules were typical for special educators in each school. Shadowing consisted of daylong or partial day observation with attention to the tasks that comprise special educators' workday, their collaboration and interaction with others, and the ways in which they support the inclusion of students with disabilities. Field notes from these observations included rich descriptions of the educators' actions and interactions. Additionally, we took pictures to capture documents or tools that educators used in their work. These observations provided another opportunity for member checking as we were able to receive clarification from teachers about the practices they use to implement inclusion by asking questions as they went about their day-to-day work.

2.3.3.3 Social network survey

After observing practices that resembled routines in special educators' daily work, we conducted a social network survey toward the end of each school year in order to more systematically examine patterns of interaction across all staff members and explore the extent to which these potential routines may be evident in those patterns. Staff members reported their typical interactions with others in the school related to special education students or issues, which allowed us to visualize the whole school network of typical special education interactions and extract each teacher's egocentric interaction network. We drew upon this data to compare the characteristics of interaction networks across schools. We analyzed the density and centralization of each school's special education network. We also compared the extent to which interaction patterns captured by the survey aligned with organizational routines, identified through interviews and observations.

The survey included questions consistent with those used in social network research for uncovering patterns of interaction (Borgatti et al., 2013). The survey asked participants to select

with whom they have discussed special education issues or students during that school year from a list of consenting staff members, rate the frequency of their interactions using an absolute scale ("a few times this semester", "monthly", "weekly", or "daily"), and to provide basic demographic information. We administered the survey to all staff members with direct or indirect instructional responsibilities in Willow (n = 121) and Elm (n = 52). Of the staff members invited to participate, 78 percent of teachers from Willow and 83 percent from Elm completed the survey.

2.3.4 Analysis

We used a comparative case study design to explore how Willow and Elm organized to implement inclusion. Our analyses identified and compared formal and informal organizational structures that each school utilized to enact their inclusion programs.

2.3.4.1 School organizational structures

We performed thematic, qualitative analysis of interview transcripts in order to understand the formal structures in each school that organize resources for inclusion, including two rounds of coding. Our first round of codes were developed inductively as well as deductively, reflecting established themes from previous special education literature as well as emergent categories and themes identified through an initial read of interview transcripts. We systematically applied the coding scheme to transcripts from interviews with district and school level administrators, general educators, counselors, assistants, and special educators at Willow (n = 29) and Elm (n = 18). After coding all transcripts, we retrieved coded text using NVivo and then organized coded text around emergent, second round codes that revealed how resources were organized for

inclusion (e.g. allocation of special educators, special educators' schedules, physical spaces). From these second round codes, we created a detailed case summary of the way that resources for inclusion were organized and embedded in the structures of either school. From these detailed case summaries, formal organizational structures emerged as participants described the structures that shape how they spend their time and how other resources for inclusion are allocated.

2.3.4.2 Teacher interaction networks

We sought to understand the structure and composition of educators' special education-related interactions in each school. We employed social network analysis using UCINET software (Borgatti, Everett, & Freeman, 2002) to calculate properties of Willow and Elm's special education interaction networks, drawing on survey data. Density is calculated as the proportion of connections relative to the number of possible ties. UCINET measures centralization by calculating how central each individual is in the network (i.e. how many ties they have) and then summing the difference between each individual's centrality score and the score of the network's most central node. Both centralization and density scores range from 0 to 1, with a score of 1 signifying that a network is maximally dense (every member is connected to every other member) and completely centralized (all connections flow through a central member). These measures control for the total number of ties in a network, which makes it possible to compare networks of different sizes (Borgatti, Everett, & Johnson, 2013).

2.3.4.3 Organizational routines

In the next part of our analysis, we utilized interview transcripts, observational field notes, and survey data in order to achieve triangulation (Yin, 2013) in identifying dominant routines for

inclusion. Our analysis involved five phases, outlined in detail in Table 3. We identified potential routines as they were described in the interviews, and then verified their existence in practice with observational data. The interviews and observations led us to hypotheses regarding which routines were dominant in the daily work of special educators, which we were able to test utilizing the social network data. Specifically, we used this network data as another data point for triangulation in order to compare the patterns of interaction described in each routine to those reported by staff members in they survey and strengthen our claims about the routines that guide the implementation of inclusion. We isolated the "ego networks" of the special educators, comprised of all survey participants who report interacting with each special educator.[5] Using the UCINET software, we generated descriptive statistics and visualizations of ego networks (Borgatti et al., 2002). We compared those patterns of interaction to the patterns of interaction described in each dominant routine. In the final phase we reviewed codes capturing the enactment of each routine in order to conceptualize the type of support offered to students.

2.3.4.4 Limitations

Our approach has several limitations and unique affordances. We seek to understand the daily work and routines of educators with interviews, observations, and social network data from a single time point. Although none of these sources alone can tell us about practice over time, our triangulation of these sources provides a unique perspective on teachers' daily work. Additionally, while we know that successful inclusion relies upon the participation of both general and special educators, we chose to emphasize the role of special educators in routines for inclusion. During initial interviews, staff members in both schools made clear that special educators were central actors in the inclusion program. Furthermore, our analysis of the social networks surveys confirmed that most of the interaction related to special education in both

schools flowed through special educators. Therefore, we are confident that this analytic decision is true to the way teachers conceptualized and enacted inclusion in Willow and Elm. Still, we sought to incorporate general educator perspectives based upon interviews, their survey responses, and field notes from shadowing special educators. Lastly, our analytic decision to shadow special educators in their daily tasks did not end up providing an opportunity to observe general education instruction in Willow. While we anticipated that special educators would spend time inside of general education classrooms, only Elm's special educators spent substantial time inside of general education classes. While our observations from Willow do not provide much insight into general education instructional practice, they reveal a lot about the extent to which special educators supported what goes on inside general education classrooms.

2.3.4.5 Trustworthiness

We took several measures to ensure the trustworthiness and reliability of this study. First, we drew upon data from a variety of participants as well as data sources (e.g. interviews, observations, social network survey, and artifacts) in order to search for convergence in determining the major themes in our findings. Second, we systematically looked for disconfirming evidence throughout the analysis process in order to strengthen our case that there were not competing themes emergent in the data. For example, we attended to differences in teacher enactment of the potential organizational routines for inclusion. In several cases, we found that not all special educators utilized a particular routine, and so excluded those potential routines from subsequent analyses. Third, our data analysis process was collaborative, involving researchers who were directly responsible for collecting the data as well as one researcher who was not involved at the time. Throughout the analysis process, we created memos to capture emergent themes and held ongoing meetings to engage in discussion and arrive at consensus

when needed (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005; Miles, Huberman, & Saldana, 2013).

2.4 FINDINGS

Guided by our multi-level conceptual framework, we found that both schools were influenced by a similar institutional pressure, namely the inclusion logic, but the schools had distinctive organizational structures that broadly shaped teacher routines and interactions. These organizational structures determined how resources, including teachers' time, were allocated. Informally, both schools utilized a dominant routine for inclusion that largely directed the work of special educators and their interactions with others. Willow and Elm's dominant routines varied in the extent to which they afforded students equitable learning opportunities.

2.4.1 Institutional logic of inclusion in Willow and Elm

The institutional logic of inclusion was embraced by educators in Willow and Elm. Comments from leaders in both districts provide some evidence that they have internalized a belief that inclusion is the right thing to do for students with disabilities. In fact, superintendents from both school districts described the origin of their move towards inclusion as stemming from a desire to do what is best for students in addition to responding to policy pressures. Willow's superintendent explained his message to others in the district, echoing the sentiments behind IDEA, as he championed the push for inclusion:

> And then we started pushing for inclusive practices across the district, and I said, "We are not going to have separate. Separate is not equal. You're not going to deny these kids access to the programming."

Elm's superintendent voiced his belief that students with disabilities rise to the challenges that they are afforded, and explained that inclusion was already a district priority before the state applied pressure, "We were already moving in that direction."

In addition to ascribing to a fairly unified rationale for inclusion, leaders in Willow and Elm described a similar vision of successful inclusion. This vision included the co-teaching service delivery model with successful collaboration between general and special education. While implementation varied, staff from both schools expressed that co-teaching was the service delivery model toward which to strive. Despite its consultation model, Willow's leaders said that their vision was to move toward more co-teaching and for general and special educators to develop true "cohesive relationships" in the classroom. Willow's special educators acknowledged that their district wanted to see them engage in more co-teaching and become a regular presence in general education classrooms. Co-teaching had been a part of Elm's model for several years. While co-teaching is only one approach to inclusion, Willow and Elm's unified vision suggests an overarching logic that co-teaching is the idealized inclusionary practice.

Parallels between Willow and Elm's rationales and goals for inclusion suggest that a unified institutional logic of inclusion influenced leader decisions. While these districts enacted different models, leaders in both schools viewed inclusion as morally desirable and faced normative (in addition to regulatory) pressures to implement special education in a way that is optimally inclusive for all students. The following sections illustrate the formal organizational structures and informal routines that emerged as the schools implemented the inclusion logic.

2.4.2 Formal organizational structures and service delivery models

In our examination of Willow and Elm, it became clear that certain formal organizational structures shaped the way that resources were allocated to enact inclusion. We found that the co-teaching and consultation service delivery models interacted with school organizational structures in ways that enabled or constrained teacher practice.

2.4.2.1 Willow's consultation model

At Willow, students with disabilities were supported in general education classrooms and settings through the consultation service delivery model. Special educators were meant to serve as expert consultants to all general educators, informing them of student learning needs, specific instructional strategies, and other specialized supports that students with disabilities require. All general educators could receive consultation from special educators if needed, and some general educators with a large number of students with disabilities in their class also had the support of an instructional assistant (IA). While this model is theoretically sound, special educators' enactment of the model was constrained by the school's organizational structures.

Several organizational structures at Willow contributed to special educators feeling, as one teacher described, "spread thin". Five special educators were allocated to support approximately 175 students with disabilities. Consequently, each special educator managed a caseload of approximately 35 students with disabilities, generally in the same grade level. Additionally, teachers served as consultants to the teachers in an assigned content area (e.g. English, mathematics, social studies, etc.). This left special educators responsible for supporting the learning needs of virtually all of the school's 175 students with disabilities by consulting with approximately 17 to 18 general educators in their content area. With such a high volume of

students and teachers to support, it was unrealistic for special educators to be knowledgeable about classroom instruction, to engage in substantive exchanges with all of the teachers they supported, or to spend time regularly inside of classrooms.

Other organizational structures at Willow seemed to be better aligned with the consultation model. IAs were allocated to support students with disabilities in some classes, particularly classes with higher concentrations of students with disabilities, or what the school referred to as "lower-level" classes. Presumably, IAs could have kept special educators informed about student performance or class assignments. Administrators made some effort to cluster special education students into the same classes so that IAs could feasibly support more students with disabilities. Additionally, special educators had the flexibility to make their own schedules on a day-to-day basis. With no set schedule, special educators tried to make time to visit the classes in their assigned content area and check in with teachers. While IAs and flexible teacher schedules supported the consultation model by freeing special educators to consult across the school, the resources allocated to special education positions relative to the number of students made it unlikely that special educators would be able to work closely with general educators. Thus, Willow's structures constrained special educators' opportunity to be involved in the day-to-day practices of teaching and learning.

When we consider the constraints presented by Willow's formal organizational structures, we begin to understand why special educators may not be realizing the superintendent's vision of the special educators as expert consultants whose support enhances general educators' instruction. The superintendent explained:

> I don't believe at this point in time that our teachers have really truly embraced what their new role is yet in the district. I think they're doing the same thing that they did for the last

ten years in inclusion and adapting material, and the kids are being sent down to them, and I'm trying to say to them that, "You are to be experts of the field."

2.4.2.2 Elm's co-teaching model

Elm's service delivery model for inclusion revolved around co-teaching. At each grade level, the school designated one English and one mathematics class to be co-taught by a general and special educator. Science and social studies classes were also co-taught for some grade levels, as the special educators' schedules permitted. The school's organizational structures were generally aligned to the co-teaching model, enabling special educators to spend time inside of classrooms regularly. First, the allocation of special educators and their designated roles reinforced the co-teaching model. Four special educators were allocated to support approximately 60 students with disabilities, leaving teachers with smaller caseloads ranging from 10 to 25 students. Each special educator managed a student caseload at a specific grade level, and also co-taught in that same grade level.

Further, the school structure for scheduling students was designed around the co-teaching model. Special educators worked with counselors to "hand-schedule" students into co-taught classes before creating the rest of the school schedule. This ensured that students with disabilities were clustered into a smaller number of classrooms, enabling the special educators to more feasibly support all students. Additionally, the general educators who were assigned to co-teach remained relatively stable facilitating stronger relationships between co-teachers. Elm's special educators were scheduled to co-teach in the same classes daily, as well as to work with students on their caseload in a daily study hall period. Special educators scheduled regular co-planning sessions with their co-teaching partners, which took place approximately twice per month, and the school allocated substitute teachers to create time for these co-planning sessions. Overall,

Elm's formal organizational structures supported special educators in enacting the co-teaching model, affording them a greater opportunity to be involved in daily practices of teaching and learning.

2.4.2.3 Implications of organizational structures

Formal organizational structures in Willow and Elm played a significant role in determining how special educators spent their time, either supporting or constraining their practice. While the co-teaching and consultation models promote an idealized vision for what teacher practice should look like, it is necessary to look beyond this vision to understand how practice is enacted. Each service delivery model for inclusion relies upon special educators having a certain level of involvement in, or knowledge of, the teaching and learning in general education classrooms. Willow's structures constrained special educators' opportunity to be involved in classrooms and to be knowledgeable about the learning needs of all students they were tasked with supporting. As a result, we would expect that general educators in Willow would receive only minimal or surface-level guidance from special educator consultants. On the other hand, structures in Elm created opportunity for regular special educator involvement in classrooms and daily interaction with their general education co-teaching partners.

We draw two major conclusions from examining Willow and Elm's organizational structures for inclusion. First, service delivery models for inclusion alone (i.e. consultation and co-teaching) may tell us little about teacher practice and student support if we do not understand how school structures interact with a school's selected model. Second, we can understand how these structures support or constrain teacher *opportunity* to be involved in aspects of teaching and learning but we cannot understand day-to-day *practice* through this lens. For that, we look to teacher interaction networks and organizational routines.

2.4.3 Teacher interaction networks

We broaden our examination of how schools organize for inclusion to look beyond formal structures and attend to informal patterns of interaction, a critical component of inclusionary practice. To do this, we examined teacher, staff, and administrator interactions about supporting students with disabilities through social network analysis. The resulting interaction networks shows us the flow of information related to enacting the inclusion model that is embodied in formal structures.

Overall, we found that teacher interaction networks related to special education were quite similar in Willow and Elm. Both school networks were relatively dense and centralized in structure (see Table 4). This indicates that in both schools, interaction about special education tended to involve a core group of educators, who had greater power to control the information that flows through interactions. In both schools those most central members in the network were special educators, as measured by their in-degree centrality. In-degree centrality counts the number of others in the network who said that they interact with a particular member about special education. Special educators in Willow interacted with approximately 5 to 6 times more staff members than did non-special educators regarding special education students or issues (see Table 4).

Together, findings from the teacher interaction networks revealed that the majority of interactions about special education issues and students included special educators. This underscores the need to examine special educators' work routines. Due to their position in the interaction network, special educators had a large degree of control over the information and support that other educators received about special education, particularly in Willow. But what

was the nature of those interactions, and what information or resources flow through them? We address these questions in our examination of organizational routines.

2.4.4 Dominant routines for inclusion

While special educators in Willow and Elm were similarly central in their schools' interaction networks, what transpired in those interactions was qualitatively different. In the day-to-day actions and interactions of special educators, distinct organizational routines for inclusion were evident in both Willow and Elm. Specifically, we identified a dominant routine in each school that heavily structured the work and interactions of special educators as they sought to include students with disabilities in general education classes. Because special educators were so central in each school's interaction network, these routines reveal the content of educator interactions and the information that might have been transmitted through them. Thus, the nature of these routines has powerful implications for the information exchange, teachers' practice, and ultimately, student supports.

2.4.4.1 Willow: Administering tests

Willow's formal organizational structures required that special educators support a large number of students with disabilities and their general education teachers as they their formal role as consultants. Not surprisingly, educators found an efficient routine to help them meet the demands of inclusion within these constraints. While different special educators varied in their enactment of other day-to-day practices, their practice around supporting students on classroom tests was highly routinized and predictable. Special educators, IAs, and general educators regularly collaborated to plan for how students would be supported during test taking.

The routine involved special educators and IAs administering tests to students, providing general accommodations and modifications, and also some level of "extra help." During observations, we saw special educators and IAs providing test accommodations resembling those that are common in special education practice, including permitting students to test in a small group setting, use supporting tools such as calculators, and reading test items aloud. While teachers said that they sometimes modified tests beforehand, teachers were frequently observed making "on-the-spot" modifications to tests such as eliminating incorrect answer choices to simplify multiple-choice questions. In addition, special educators were observed providing additional "help" on several occasions, such as extended explanations of test questions, talking students through the steps to solve math problems, and checking student answers and providing hints to guide students toward correct answers. An excerpt from the observational field notes with Ms. Smith described an example of extra "help" on tests that was observed several times amongst the focal teachers:

> Ms. Smith picks up an answer key that was lying on her desk, and then walks to the back of the classroom, where the three students are still working on their test. She first goes up to one of the female students and picks up her test. Ms. Smith looks over the answers and compares them to her answer key. She then places the student's test down and tells her to look at a few of the questions again (she directs the student to specific questions, by pointing at them with a pencil). The student doesn't say anything, but looks down at the paper and erases. (Field notes 2.1)

Ms. Miller provided similar "coaching" of students during testing:

> Ms. Miller looks down at her answer key- and then tells the student "you need to change this" and points to a number. The student erases the answer and starts walking through

the problem again. Ms. Miller then says “Oh no, you have to put 4 here,” and the student erases her work and puts a 4 down. The student gets an answer and Ms. Miller looks down and says, “Great, keep going.” (Field notes 2.4)

The routine enabled special educators to regularly coordinate with IAs and other special educators to ensure the resource room was staffed at all times, and less frequently, with general educators in their assigned content area, to know when those teachers gave tests. Norms and tools related to this routine provided structure for teacher interactions and promoted its predictability over time. For instance, special educators distributed a “referral form” for general educators to fill out when students had an upcoming test. The form told special educators when the test was scheduled, whether they wanted students with disabilities to be pulled out for testing or receive support in the classroom, and whether or not they needed the test to be modified beforehand. Special educators also asked teachers to include a copy of the answer key when they turned in a referral form.

Additionally, there were two designated “resource rooms” in the school where students could take their classroom tests with special educators or IAs. Inside each room, special educators and IAs used a grid drawn on the whiteboard to communicate when students would be coming to the resource room for testing. Because IAs were scheduled to be present in general education classes more regularly, special educators often counted on them to let them know when tests were coming up. These aspects of the routine were meant to structure and stabilize the work of special educators and their interactions with others as they strove to support a large number of students with disabilities and their general education teachers in a given content area, in order to enact the school’s consultation model.

"Administering tests" was the dominant routine for inclusion at Willow high school, based on the prevalence and predictability of this task in special educators' day-to-day work and interactions with others. In addition to the evidence for this claim from interview and observation data, we found further support in our network data. When we isolated the special education teachers' interaction networks, we found that the expected patterns of interaction related to this routine were verified: special educators interacted daily with special educators and IAs. This corroborates our conclusion that "Administering Tests" was the dominant routine for inclusion, as the routine required regular daily coordination among the special education team, but not with general educators.

2.4.4.2 Elm: Study hall routine

Elm's organizational structures enabled special educators to spend a significant amount of time in general education classrooms at their assigned grade level. Because special educators co-taught in different content areas for their assigned grade level, a routine was needed to coordinate the way in which they provided these supports. Elm's dominant routine was heavily intertwined with the co-teaching model and utilized a study hall time for special educators to provide students with additional learning supports related to general education content and assignments.

Special educators linked their knowledge of what students were working on in general education classes to the supports they provided in study hall. Primarily, they helped students complete homework and other assignments. Support ranged in intensity from reminding students about assignments to sitting down and working through the assignments one-on-one or as a group. Additionally, students received organizational and time management support related to their general education classes. At the beginning of each study hall, Ms. Keys talked through every class in her students' schedules, reminding them of what assignments they should be

working on or upcoming tests for which they should be studying. Ms. Keys was observed helping students organize their binders or prompting them to use their notes to study for tests.

The study hall routine was a predictable part of teachers' daily practice. Students in the special education program were assigned to attend a "learning support study hall" (led by a special educator) in lieu of a general study hall so that they could receive additional support with their coursework. During a focus group interview with three of the four special educators, one teacher explained the rationale behind utilizing study hall this way,

> …They're [students with disabilities] not allowed to go to a regular study hall, unless they're a higher functioning student who is pretty successful independently, then we will let them go to a regular study hall. But if we feel that we can't trust them to do the work on their own, which most of them we can't, and they won't do homework, so we force them to go into a learning support study hall.

While we observed both co-taught general education courses and study hall periods, it became clear that Elm's special education program relied on the "learning support study halls" in order to successfully include students with disabilities in general education classes. Special educators varied in their enactment of co-teaching, with some playing an instructional role (e.g. sharing in planning and delivering lessons with the general educator) and others playing an assistance role (e.g. sitting in a desk and taking notes, sitting near certain students to keep them on task). Despite variation in the way co-teaching was enacted, teacher support through study hall was a consistent and predictable feature of inclusion.

The study hall routine required ongoing interaction and coordination amongst special educators and with general educators, and guidance counselors. Teachers who led study hall regularly communicated with general educators or other special educators who taught the

English, mathematics, science, and social studies courses of the students assigned to their study hall. Knowing about assignments, upcoming tests, and sharing related materials was essential for this routine, as special educators tailored their support to the specific general education class content and assignments during study hall. Norms around scheduling were a crucial part of the study hall routine, ensuring that student schedules were created in a way that would maximize the efficiency of the routine. Ideally, counselors scheduled students into a study hall led by the special educator who was their IEP case manager, and who was also the co-teacher of classes at their grade level. This way, special educators knew class expectations, the assignments that students should be working on, and even specific learning strategies that were used in the general education classes.

The interactions described as central in the study hall routine were corroborated by the daily interactions captured in special educator ego networks. As we would expect, most of the special educators' daily interactions were with general educators. Special educators also said that they interacted with one another to learn about assignments and course content for students from other grade levels assigned to their study hall. Through this communication, the routine could still function even when scheduling constraints prevented students from being in a study hall with their caseload manager.

2.4.5 Implications for student supports

The enactment of Willow and Elm's dominant routines shaped the support that students received, and ultimately the extent to which students were afforded equitable learning opportunities. While the scope of our data collection did not explicitly measure students' learning opportunities, our

attention to the organization of resources, time, and interactions revealed several important implications.

2.4.5.1 Willow

In Willow, administering tests to students with disabilities had become a stand-in for support related to instruction and learning. Because the testing routine dominated so much of the special educators' time, they mostly interacted with students in a way that related to testing rather than instruction or learning. Of the instances of special educators' interactions with students captured in our observational field notes, almost all revolved directly around test taking or indirectly through discussion of student grades. In addition to administering tests, we observed special educators asking students about their grades, reminding students to come and take tests with them, and reviewing basic vocabulary terms before a test.

Evidence from students and teachers alike suggests that testing with special educators was considered to be a valuable support for students with disabilities. When asked how they supported students with disabilities in their classes, general educators overwhelmingly referred to testing support provided by special educators. Ms. Taylor, a mathematics teacher, replied, "Well, fortunately, they [students with disabilities] test in a small room with Ms. Miller, and so she can help them much more so than I can for a test situation." An interaction captured between a student and Willow special educator, Ms. Smith, suggests that students have come to expect special educators to provide this support on tests to help them pass:

> A [student] then pops her head into the classroom and looks at the board – the testing board – and sees that Ms. Miller is having a test during sixth period, and the girl says out loud, "I'm not going to the class; I'm going to fail the test." Ms. Smith looks at the student and says, "Don't worry; you'll definitely receive some

help on it. Ms. Hernandez (an IA) will probably be in there." And the girl shakes her head and says, "Well, I really need a modified test. I need help." Ms. Smith says, "Well, you'll definitely receive the help. It says it on your IEP, and you'll definitely receive the help." The student then walks out of the room and says, "Well, if I fail, it's all your fault." (Field notes 3.4)

We found little evidence of students with disabilities receiving specialized support related to their learning in general education classrooms. Because our data collection followed special educators, who did not spend substantive amounts of time inside general classrooms, it is possible that quality specialized instruction was delivered and that we simply did not observe it. However, what we know of special educators' role in Willow as well as comments from general educators suggest that it is highly unlikely. We found no evidence of special educators consulting with teachers about issues related to instruction and student learning or sharing specialized knowledge of students with disabilities. This was evident in general educators' comments about how they support students with disabilities in their classrooms. The most common support mentioned across general educators interviewed was that special education students receive testing accommodations and get to take their tests in a separate classroom. Aside from testing accommodations, general educators did not describe specific instructional strategies that they use to support students with disabilities. A science teacher lamented that students with disabilities received the same testing supports despite having different needs and that she received no support in actually differentiating instruction:

But it seems like when it comes to a test that we all accommodate them the same way. Let's pull them all out 'cause it's the easiest way to do it but maybe another student might do better with just one-on-one asking the questions… So I think it (should) just

depend on the student but it's not based that way… It's like they talk about differentiated instruction, but they don't give us the means to do it… They need different adaptations, and then they want you to do differentiated instruction with one person in there and you can't.

While IAs provided support inside some general education classrooms, this support was far from the specialized instruction that is promised to students in their IEPs. In fact, several IAs complained that they did not even have access to student IEPs. Thus, while we have insufficient data to make claims regarding instructional quality, our findings make clear that educator practices in Willow focused on testing as the primary means of support and generally did not involve the special and general educator collaboration that is needed for more specialized learning opportunities for students with disabilities. Instead, testing supports seem to have replaced specialized instruction as a means to ensure students with disabilities passed their courses.

2.4.5.2 Elm

Elm's study hall routine supported students primarily by helping them to complete assignments, which was essential for them to pass their classes. Observations revealed a variety of ways that special educators supported students during study hall, ranging from reminding students to study for upcoming tests to one-on-one support with assignments and even practice of IEP goals or skills. In one observation, Ms. Keys coached her students around studying for several upcoming tests and students studied independently with notes and flashcards. At the end of the period she drilled them on their multiplication tables (Field notes 4.7). In another class, she reminded students of a mnemonic device they learned in class to help them complete a geometry assignment (Field notes 5.12).

While special educators co-taught and provided different supports during study hall, teachers attributed special education students' success to their completion of assignments during study hall with special educators. One science teacher offered that study hall gives special educators a means of "keeping on top of the kids" in terms of their assignments. An English teacher describe the role support study hall played in students passing her course:

> So that's why most of the time I don't really have problems with failures because they do it over there (in study hall). Thank heavens they do it over there, you know what I mean? Because some of them have very bad organization skills. I don't think they would remember to do it if it wasn't for that, if it wasn't for the learning support teacher saying, "You sit down and write those sentences."

A special educator, Ms. Bernard, agreed that her persistence in getting students to complete assignments during study hall helped them to pass:

> Because I know they're [students] not gonna take it home and do it [homework], and I know that they're gonna lie and say that it's already done, and I know it's not, I make them produce the work… And that's how I get them to pass. I make them do it, and that's the only thing I can do…

When students with disabilities struggled in their classes, teachers emphasized assignment completion as a means for supporting them to improve their grades over re-teaching or otherwise remediating their learning. Elm's special educators described strategies for identifying students on their caseloads who were failing classes and then intervened by helping those students to make up work during study hall. Planning between general and special education co-teachers sometimes involved discussion of instructional strategies, but most regularly revolved around upcoming assignments and tests. A science teacher's comments

illustrate the weight that teachers put on assignment completion, as opposed to learning material, for determining whether students earned passing grades:

> If I just hand her (special education teacher) my lesson plans or I just say, "Hey, this is what we're doing this week," or she just kinda knows my style now where it's okay with me… None of my support kids (students with disabilities) are failing. The one that was, was because he was absent for a month and I called him and she called him, and the kid brought in some work and then Ms. Bernard sat him down in support study hall and he caught up with all of it and okay, here, we're done. We're back on track. We're passing, and it's that simple.

Overall, Elm's study hall routine supported students with disabilities by helping them to complete assignments. Completing assignments seemingly dictated whether or not students passed their classes more so than their actual learning of the content. Several general educators stated that students with disabilities were graded based upon work completion rather than the accuracy or quality of their work. A math teacher explained, "We do an adapted grading scale too that we have to do with them (students with disabilities), and it's more did they complete the work more than is it totally accurate."

2.4.5.3 Themes across schools

On a broader level, both Willow and Elm's routines for inclusion functioned in a way that allowed special educators to help students with disabilities pass their general education classes. Despite the differences in their routines, we noted two common themes. First, both routines allowed special educators to *directly* support students with disabilities. This is noteworthy because both Willow and Elm ascribed to service delivery models (i.e. consultation and co-teaching) that called for special educators to *indirectly* support students by collaborating with

general educators to improve instruction. The "Administering Tests" and "Study Hall" routines involved special educators directly supporting students with disabilities, rather than collaborating with general educators around instruction as the school service delivery models would suggest.

Second, the routines allowed special educators to help students improve their grades, regardless of their limited involvement in instructional activities. In Willow, special educators had very limited time to spend in general education classes and were rarely involved in instruction. With Elm's co-teaching model, special educators varied in the extent to which they actively took part in instruction, with some playing more of an assistant role. Despite their varying and often limited opportunities to influence instruction, these routines allowed them to bypass instruction and influence student grades through test-taking or assignment completion support.

Why did special educators focus their support on administering tests and completing assignments, rather utilizing their collaboration through co-teaching and consultation to improve student learning opportunities? Evidence from Willow and Elm support two potential hypotheses. One potential reason is that special educators felt responsible for supporting the learning of students with disabilities but had limited opportunities to do so given the configuration of formal and informal structures in their schools. In both cases, comments from special educators suggest that their routines may have emerged from a desire to support students while facing constraints of multiple other responsibilities and limited influence in the general education classroom. As a result, special educators focused on improving student grades, as this was something they could control.

An observation of a district level meeting of Willow's special educators provides insight into how their focus on testing was influenced by district and state level pressures for students with disabilities to pass courses and standardized tests:

> She (Ms. Smith) said, "We have so many other things we're supposed to be doing," and she said, "At the end of the day we really just focus on providing the modifications and accommodations that are on students' IEPs." And she said, "That's really focused around the testing." And the other teachers agree with this. Ms. Smith says that it's really knowing how to play the game. She said, "The state really wants certain things from the district and also from the special education teachers and a lot of that revolves around the IEPs being done but also the PSSAs [state standardized assessment] and ensuring that students are graduating."

At Elm, Ms. Bernard explained how her limited role in her co-taught class gave rise to the emphasis on helping students make up work during study hall:

> Co-planning doesn't really work the way I would like for it to work. My primary concern when I co-plan is–because I know I'm really not going to co-teach an English class, we never co-plan, like, "Oh, let's come up with this cool, creative lesson together, and then I can do this, and you can do this." Because that never happens. So it's, "What do my kids owe? What are their grades?" And then it's my responsibility to make those kids make up all that work…That's my responsibility. That's the way it ended up. So co-teaching is, like, bogus in there. It's really not real. It's just it looks good on paper, but it's not really happening.

While not all special educators at Elm shared Ms. Bernard's view of co-teaching, all expressed a sense of responsibility for their students' grades in the general education classes despite varying levels of control over instruction.

Another potential explanation for this focus on student grades relates to the accountability pressures experienced in both schools. As previously mentioned, both schools faced sanctions for not making AYP on state accountability assessments along with simultaneous pressure to increase the rate at which students with disabilities were included in general education classes. General educators in both schools said that while they did not feel specific pressure to pass students with disabilities in their classes, they felt general pressure from their schools around passing students. A science teacher from Elm stated, *"*There are so many hoops we have to jump through. I feel like all the responsibility is on us to make sure that the child passes." In both Willow and Elm, special educators felt that they had to ensure that certain measures were taken in order to justify failing a student with a disability including making sure that IEP accommodations and modifications were received on tests, that students had opportunities to make up work, and that parents were notified.

2.5 DISCUSSION AND CONTRIBUTION

As the special education field has undergone an institutional shift from self contained, specialized instruction for students with disabilities to inclusion in general education classrooms (Russell & Bray, 2013), schools are faced with the challenge of organizing their personnel and other resources to help students with disabilities succeed in general education settings (Obiakor, 2017). However, the field lacks a midlevel theory for understanding organizational responses to

implementing inclusion, and how these may shape teacher practice and student support. Our comparison of Willow and Elm high schools examined how the co-teaching and consultation models interacted with Willow and Elm's organizational structures. We found that the interaction between school organizational structures and these models enabled or constrained teacher practice. Rather than arguing that one service delivery model for inclusion is inherently better than the other, we conclude that each model will only be as successful as school organizational structures permit.

How do teachers enact these models given organizational constraints? The concept of organizational routines provides a productive lens for linking formal school organizational structures to informal structures of teacher interaction and practice. In each school, a dominant routine largely guided the day-to-day work and interactions of special educators. Both routines functioned in a way that emphasized student grades as the desired outcome, but Elm's routine afforded students more learning opportunities in the process. With limited opportunities to support student learning through their service delivery models and organizational structures, special educators developed these routines to support what they could control: student grades.

2.5.1 An emerging mid-level theory of inclusion

The concept of organizational routines, corroborated through exploration of teacher interaction networks, focused our attention on midlevel aspects of inclusion that have not been widely researched: connecting macro-level institutional forces such as the inclusion logic to the daily practice of educators. Our conceptualization of special education as an institution attends to the macro-level visions of practice that put pressure for conformity on educators. Organizational routines provided a conceptual and analytic bridge between organizational structures and the

daily practice of educators, and social network analysis helped us to more precisely see routines in practice. Based on our study findings, we propose three overarching themes for an emerging, mid-level theory of inclusion:

The interaction between service delivery models and school organizational structures channels teacher practice. Although we compared the implementation of inclusion in high schools through two different service delivery models, we caution that our purpose was not to compare the relative merits of co-teaching and consultation. Both models have their own theoretical strengths and challenges, which have been documented by research and underscored by this study (Cook et al., 2011). Furthermore, these are not the only accepted models for inclusion, as school-wide frameworks including Response to Intervention (RTI), Multi-tiered Systems of Support (MTSS), and Universal Design for Learning (UDL) are increasingly prevalent (Obiakor, 2016). Instead, we extend what is known about implementation from an organizational lens by exploring how service delivery models are embedded in school organizational structures. It is their embeddedness in school organizational structures, and not solely the models themselves, that determine how successful they will be in supporting students with disabilities. When we consider the system-level constraints in both high schools, it is clear that formal organizational structures can either facilitate or hinder the practice of each model. While service delivery models like consultation and co-teaching set the vision for how inclusion will be enacted in schools, we posit that other organizational structures in schools ultimately determine how this vision can be enacted by enabling or constraining different practices.

Inclusion as an institutionally rational shift. When faced with institutional pressures for change, organizations may adopt approaches that range from institutionally rational (i.e. emphasizing symbolic alignment and compliance) to technically rational (i.e. meeting

institutional pressures in an efficient manner) (Coburn, 2004; Oliver, 1991; Ogawa, Sandholtz, Martinez-Florez & Scribner, 2003). We posit that formal organizational structures set a school's vision for inclusion, and informal structures like organizational routines reveal the nature of an organization's response to institutional pressures, in practice. Willow and Elm's responses to pressures for inclusion through their respective routines constitute a shift that is institutionally but not technically rational.

Recall that researchers promote certain best practices for implementing inclusion so that all students with disabilities may be afforded an education that is equitable; including collective responsibility for student success, and time allocated for special educators to support high quality instruction inside general education classrooms (Mcleskey et al., 2014a; McLeskey et al., 2014b). Jorgensen and colleagues (2012) contend that student supports in successful inclusive schools are those that will "enhance social and academic participation in general education classrooms and other inclusive settings" (p. 7).

Teachers in our focal schools struggled to implement these best practices, and their support offered to students with disabilities fell short of this vision. Instead of structuring teacher actions in a way that promoted collective responsibility and efficiently provided opportunities to improve instructional quality, Willow and Elm's routines symbolically achieved inclusion by focusing on an outcome that is equated with inclusion success: passing grades for students with disabilities. The routines for inclusion also functioned in a way that did not require substantial change in these schools. Teaching and learning inside general education classrooms were largely unaffected by the "Administering Tests" and "Study Hall" routines for inclusion. Instruction did not have to change or improve to help students with disabilities achieve more equitable

outcomes, as these routines allowed students to improve their grades, perhaps regardless of their understanding of course content or their participation in general education settings.

Our examination of inclusion with an organizational lens provides evidence that high schools may function as successfully "inclusive" while bypassing these difficult-to-implement best practices that seek to enhance student learning. This underscores the sentiments of researchers who caution that more placement of students with disabilities in inclusive settings is not necessarily better if it does not coincide with improved instruction for students in those settings (Kauffman et al., 2017; Zigmond, 2015).

Routines as "educational triage." The institutional logic of inclusion, interacting with existing school structures, led to triage-like responses from educators in Willow, and to a lesser extent Elm, when supporting students with disabilities. Educational triage refers to practice of sorting students and assigning priority to how educational resources should be allocated based on their likelihood to achieve success. In her study of one school's response to the Texas Accountability System, Booher-Jennings evokes this concept to describe the school's diversion of resources to support students who are just "below the bubble" for reaching proficiency on state accountability assessments (Booher-Jennings, 2005).

The supports offered to students through the dominant routine at Willow bears semblance to a sort of "educational triage". Through this routine, special educators were utilized in a way that seeks to reduce failure amongst students with disabilities. Their time allocation prioritized students who were at risk for failing or who are already failing. While this trend was clearly evident in Willow, both schools described methods for targeting which students needed the most urgent support (i.e. are failing their classes). In Willow, special educators regularly looked at their students' progress reports to see which students were failing. In Elm, special educators used

co-planning time to talk about student grades and specifically which students are at risk for failing. After prioritizing these students, teachers used their time with these students in a way that is most likely to achieve "success" (i.e. improved grades).

These triage oriented responses are likely intensified in schools like Willow and Elm that are low performing on state outcome metrics. In the context of accountability pressures along with structural constraints, educators feel pressure to engage in short term fixes and narrow the focus of education to performance measures that are more easily achieved such as getting students to pass grades. This phenomenon is similar to the focus on "teaching to the test" and the focus on "bubble students" that has been documented in studies of test-based accountability (Au, 2007; Booher-Jennings, 2005; McNeil, 2002). Our work extends this body of research by showing how these pressures shape the way that schools enact inclusion and the supports that are afforded to students with disabilities. While the concept of educational triage need not be inherently negative, we argue that triage responses that do not focus on learning or deny some students necessary support result in inequitable learning opportunities.

It is unclear if Willow and Elm's triage-like responses would generalize to schools not under similar accountability pressures. However, the intention of this study is not to produce findings that are generalizable to other schools. Instead, we seek to generate theory about how institutional pressures interact with formal school structures and informal routines to shape teacher practice and student supports.

2.5.2 Future directions for practice and research

Our findings suggest several future directions for special education practice. Overall, school leaders and teachers must recognize the ways in which their organizational structures and

routines influence teacher practice and the support students receive. First, practitioners should take care to examine their inclusive practices to ensure that they offer equitable *access* to learning opportunities as well as equitable *benefit* from those learning opportunities. We suggest that Willow and Elm's routines for inclusion may have bolstered the appearance of equity by helping students with disabilities to earn passing grades. However, particularly in the case of Willow, this was done without providing equitable access to learning opportunities. Students with disabilities require specialized instruction to help them access grade level content, but these routines allowed students to earn passing grades even if they did not have specialized instruction. Equitable outcomes for students with disabilities are only meaningful if they are achieved by way of equitable access to learning opportunities. These implications for equity may not necessarily apply to students with low incidence disabilities, who are included at a lower rate (Kurth et al., 2014). While students with low incidence disabilities may not have the same access to general education content, they may still be receiving specialized instruction that was largely absent in Willow and Elm's inclusion programs.

Second, school structures and routines should align to established best practices that allow special educators to help improve instruction inside general education classrooms as well as to collaborate around instruction with general educators (Mcleskey et al., 2014a; McLeskey et al., 2014b). Specifically, formal school structures should afford special educators the opportunity to help improve instruction inside general classrooms, whether indirectly through consultation or more directly through their co-teaching. This requires that teachers have both designated time for collaboration as well as a manageable caseload of students and teachers to support. While other researchers have underscored these requirements for successful inclusion, especially in high

schools (e.g. Dieker, 2001; Scruggs et al., 2007; Wasburn-Moses, 2005), we urge special education professionals to also look at the importance of collaborative routines.

Organizational routines can support stability but can also introduce change (Feldman & Pentland, 2003). Intentionally designed routines have been found to successfully introduce and sustain change in teacher practice (Sherer & Spillane, 2011; Spillane et al., 2011). School and district leaders should leverage general and special educators as designers of new organizational routines for inclusion, as they are most aware of the unique constraints they face. Collaboration between special and general educators around issues of teaching and learning should be at the forefront of these routines and new routines must be supported by school structures, which allocate critical resources. Without careful design of such structures and routines, our case study cautions that educators can fall into the trap of achieving symbolic inclusion success by emphasizing passing grades without focusing on equitable learning.

While we sought to generate a mid-level theory of inclusion, our study offers implications for future research more broadly. Our conceptual framework for bridging institutional influences, organizational structures, and practice may be a productive lens for examining policy implementation. Research has attended to institutional influences (Burch, 2007; Coburn, 2004; Ogawa, 1994) or the link between organizational structures and teacher practice (Coburn & Russell, 2008; Spillane et al., 2011; Diamond & Spillane, 2004), but our mid-level theory provides a means for linking these lines of research. Additionally, this study offers a unique approach for identifying emergent organizational routines using multiple data sources including interviews, observations, and network data. This approach could benefit future research seeking to understand how collaborative practice unfolds within organizations.

In an era of strong institutional pressure for inclusion, it is important we consider how schools are organizing to support students with disabilities. While often overlooked, school organizational structures and the informal routines that govern teacher practice have critical implications for equity and inclusion.

Notes:

1. While special education advocates may interpret what constitutes a student's LRE differently, federal law requires that schools report and are monitored on the percentage of time that students with disabilities are educated in general education settings.
2. This is true for students with more commonly occurring disabilities (i.e. "high incidence disabilities" such as learning disabilities and speech and language disorders), while the inclusion of students with less commonly occurring disabilities (i.e. "low incidence disabilities" such as deaf-blindness) lags behind (Kurth, Morningstar, & Kozleski, 2014).
3. This demographic data is from the 2009 – 2010 school year, which was the first year of data collection for this investigation.
4. Four special educators from Willow were not included in this sample as their roles were administrative and not instructional (e.g. Transition Coordinator) or did not involve supporting the inclusion of students with disabilities (e.g. self-contained or "Life Skills" teachers). All special educators from Elm were included as their roles involved instructional duties and supporting the inclusion of students with disabilities.
5. We chose to use incoming, daily ties to define each special educator's ego network of close colleagues. Using incoming ties (i.e. survey responses generated when educators noted interacting with the special educators) highlights the perspective of other educators, many of whom were not directly interviewed or observed, and so adds validity to our claim. We chose to focus on those who reported interacting with the special education teacher(s) daily in order to strengthen our claim that these routines structure the day-to-day interaction of teachers.

2.6 TABLES AND FIGURES

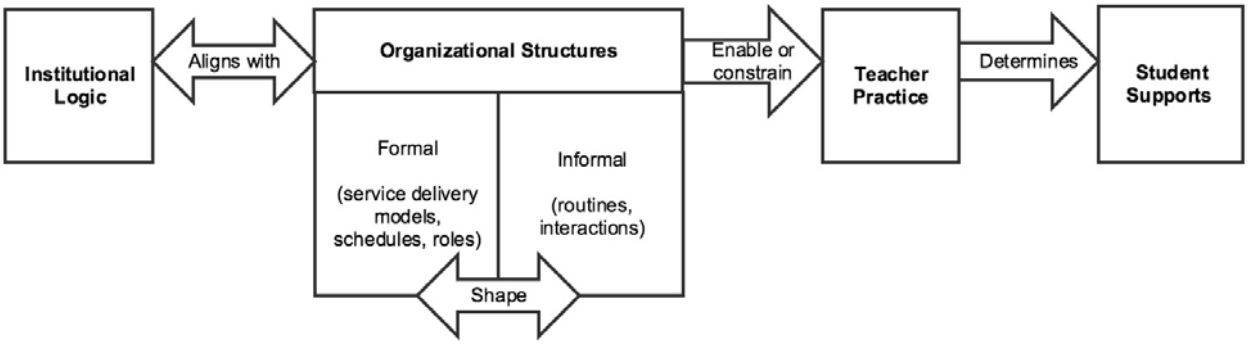

Figure 2. Conceptual framework

Table 1. Special education populations in Willow and Elm school districts, 2010-2011

	Willow	Elm
Total enrollment	3,966	1,717
Percentage with disabilities	17.2%	11.9%
Percentage of Special Ed Enrollment by Disability		
Specific Learning Disability	36.7%	41.5%
Speech or Language Impairment	18.9%	16.1%
Intellectual Disability	13.0%	15.6%
Emotional Disability	10.4%	0.0%
Other Health Impairment	9.2%	11.7%
Autism	7.6%	8.3%
Hearing Impairment	1.6%	0.0%

Table 2. Data from Willow and Elm high schools

Data Collection Method	Documentation	Willow	Elm
Interviews	Audiotaped and transcribed	29 7 administrators, 7 general educators 6 counselors/other 5 special educators 4 assistants	19 3 administrators, 8 general educators 4 special educators 3 counselors/other
Observations	Field notes	~30 hours 2 special educators shadowed	~30 hours 2 special educators shadowed

Table 2 continued

Artifacts	Copy or photo	400+	50+
Social Network Survey	Paper-based survey	121 respondents	52 respondents

Table 3. Phases of analysis for identifying organizational routines

Phase of analysis	Data source(s)	Criteria
1. Identify potential routines	Interviews	Meets Feldman & Pentland's (2003) criteria: • Repetitive patterns • Involve multiple actors • Interdependent actions
2. Verify existence of routines in practice	Observations	Present in observation and support Feldman & Pentland's (2003) criteria
3. Hypothesize dominant routine for inclusion	Observations, Interviews	Serves a function related to inclusion and organizes the daily work of special educators
4. Test hypothesis of dominance	Social network survey data	Extent to which school-wide interaction patterns reported on survey corroborate those involved in routine
5. Examine nature of student support in routine	Observations	Type of support offered to students through each instance of enactment of routine

Table 4. Teacher interaction networks in Willow and Elm

	Willow	Elm
Density	0.16	0.17
Centralization	0.73	0.59
Mean in-degree centrality of special educators	33	12
(Standard deviation)	(4.28)	(1.26)
Mean in-degree centrality of others	7	2
(Standard deviation)	(4.76)	(2.63)

3.0 PAPER 2:

NEGOTIATING COMPLEX GOALS: THE CASE OF ONE HIGH SCHOOL'S SYSTEM FOR INCLUDING STUDENTS WITH DISABILITIES

Effectively including students with disabilities in general education, high school settings requires school-wide change. While research has surfaced important features of effective inclusive high schools, researchers tends to examine these features in isolation rather than as interconnected parts of a system. Influenced by systems analysis, this in-depth qualitative case study describes one high school's system for supporting students with disabilities. The elements of the school's system interacted in complex ways; some of which supported the goals of inclusion, and others that surfaced additional pressures faced by the school. While some elements of the school's system interacted to support inclusion, the system ultimately had to be responsive to broader school pressures, including teacher autonomy and accountability pressures. These pressures seemed to drive the behavior of the system more so than pressures related to inclusion. We describe how a systems perspective is an appropriate lens for illuminating the complexity of implementing inclusion in high schools, and also provides a frame for conceptualizing improvement.

3.1 INTRODUCTION

Effectively supporting students with disabilities in general education, high school settings is a complex, school-wide undertaking (McLeskey et al., 2014a). Policies increasingly promote the inclusion of students with disabilities (SWD) in general education settings, but provide minimal guidance to schools about the details of implementation. The Individuals with Disabilities Education Act (IDEA, 2004) requires that SWD be educated in their least restrictive environment (LRE), which refers to the setting closest to the general education setting while still meeting the student's individual needs. The No Child Left Behind Act (NCLB, 2002) and currently the Every Student Succeeds Act (ESSA, 2015) hold schools accountable for the achievement of SWD in grade level standards. Indeed, the percentage of SWD who receive the bulk of their instruction in general education settings has steadily increased over the past few decades, from thirty to almost sixty percent of students who spend at least eighty percent of their time in general education settings (NCES, 2016).

While the concept of inclusion has evolved to cover more than just SWD and their placement in general education settings (Mitchell, 2015), the rate at which SWD are included in general education settings remains a real policy pressure with which schools must contend. Under the LRE provision of IDEA, schools are monitored on the percentage of time that students with disabilities are educated in general education settings. Our study takes place in Pennsylvania, where a legal settlement resulted in stronger district-level monitoring of the amount of time SWD are included in general settings (Gaskin v. Commonwealth, 2005).

While such policies provide broad directives about *where* students should be educated, it is ultimately up to schools to craft local policies strategies around what inclusion will look like in practice. School efforts to rebrand the roles and responsibilities of special educators are

prominently featured in the literature about school implementation of inclusion (e.g. Eisenman, Pleet, Wandry, & McGinley, 2011; Laframboise, Epanchin, Colucci, & Hocutt, 2004; McCray, Butler, & Bettini, 2014; Wasburn-Moses, 2005; Weiss & Lloyd, 2002). One of the most popular strategies for implementing inclusion is co-teaching (Cook, McDuffie-Landrum, Oshita, & Cothren Cook, 2011), which refers to the practice of "two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space" (Cook & Friend, 1995).

The complexity of implementing inclusive education programs, and specifically co-teaching, has been widely discussed and empirically examined (Cook et al., 2011; Friend, Cook, & Hurley-chamberlain, 2010; Rivera, Mcmahon, & Keys, 2014; Scruggs, Mastropieri, & McDuffie, 2007). A common theme amongst these studies is the school-wide changes required for successful implementation. Based on a review of theoretical and empirical literature on the implementation of co-teaching, Rivera and colleagues (2014) lay out several school-level and teacher-level best practices. At the school level, administrative support, a culture of serving all students, common planning time for teachers, effective training, and a schedule conducive to teacher collaboration and student-centered teaching approaches are important. At the teacher level, effective co-teaching is facilitated by parity amongst general and special educators, aligned teaching philosophies, effective use of planning time, and special educators having some mastery of content.

These school and teacher-level practices are particularly challenging to implement in high schools due to their organizational structures and norms (Cole & McLeskey, 1997; Dieker & Murawski, 2003; Schumaker & Deshler, 1988). First, collaboration and parity between general and special educators can be more difficult to achieve due to a number of factors. SWD are

educated by a larger number of general educators, making it difficult and often unrealistic for special educators to find time to plan and collaborate with all of these teachers. It is also uncommon for special educators to have training in the more advanced content taught in students' classes, which can make planning and parity difficult. Additionally, the norm of autonomy when planning lessons and courses at the high school level that can make collaboration and co-teaching a difficult adjustment. Finally, high schools face the added pressure of preparing students for post-school education and careers, teaching life skills, and helping students to demonstrate competency on required tests for graduation (Dieker & Murawski, 2003; Schumaker & Deshler, 1988).

It is clear that implementing inclusive programs, particularly at the high school level, requires system-wide change. Yet, existing research tells us little about the systems through which schools implement inclusion. A systems perspective illuminates the different elements or subsystems that work together to achieve a broader goal, in this case inclusively educating SWD, and the ways in which they interact (Abercrombie, Harries, & Wharton, 2015; Coffman, 2007; Foster-Fishman, Nowell, & Huilan, 2007; Maani & Cavana, 2000; Midgley, 2000). Researchers have long called for school-wide or systemic change for implementing inclusion (e.g. Lipsky & Gartner, 1997; McMaster, 2013; Theoharis & Causton, 2014), but research studies tend to focus only on one or two elements of the system at once. For instance, researchers have focuses on classroom practices (Magiera & Zigmond, 2005; Mastropieri et al., 2005; Zigmond & Matta, 2004), teachers' roles (Laframboise et al., 2004; Wasburn-Moses, 2005; Weiss & Lloyd, 2002), school culture and teachers' attitudes (Austin, 2001; Idol, 2006), or logistical challenges and facilitators (Idol, 2006; Kohler-Evans, 2006; Murray, 2004). However, implementation does not happen in a vacuum. Rather, systems thinking tells us that a change in one element of a school

system, such as implementing a new reform or practice, influences and is influenced by all other elements in the school system (Abercrombie et al., 2015; Coffman, 2007; Foster-Fishman et al., 2007). We know of few studies that systematically study multiple elements of the school system and help to visualize their interaction (Isherwood & Anderson, 2008).

In this in-depth case study, we conceptualize a high school's implementation of inclusive special education practices as a "system of support". We investigate the elements that comprise this system, the ways in which they interact to support the school's explicit goals related to inclusion as well as other broader pressures that the school faces. Overall, we find that the school's system of support is deeply constrained by pressures and unstated goals from the broader school and district in which it is embedded. Uncovering these unstated goals helps us to deepen our understanding of the challenges high schools face when implementing inclusion and provides fresh insight into factors that may facilitate or hinder the design of successful high school inclusion programs. Scholars and practitioners from fields including healthcare and business have learned that understanding how a system functions is an important precursor for designing improvements (Abercrombie et al., 2015; Coffman, 2007; Foster-Fishman et al., 2007; Langley, Moen, Nolan, Nolan, Norman, & Provost, 2009).

3.2 CONCEPTUAL FRAMEWORK

We draw on systems and organizational theories to inform our conceptualization of how schools, as organizations, respond to policy pressures. While special education policies provide broad directives, it ultimately falls to schools to determine how they will craft their approach to implementation. In this section, we first describe how school implementation of inclusive

practices can be thought of as a complex system, comprised of different interrelated elements. We then describe our analytic lens of goal complexity. Meeting federal, state, and district policy demands is an obvious goal that schools must work toward when implementing inclusion. Many educators and leaders are also motivated by personal beliefs and a prevailing societal norm that inclusion is what is best for SWD. At the same time, we argue that efforts to implement inclusion in a large comprehensive high school inevitably confront the plural and diverse other goals that schools and districts pursue. Although they may be more implicit in discussion of special education policy and practice, these goals also shape how schools implement inclusion (see Figure 3 for a depiction of our conceptual framework). Uncovering how a school's "system of support" for inclusion interacts to meet both stated and unstated goals helps to more fully understand implementation challenges and implications for improvement.

3.2.1 Inclusion as a complex system

Effectively and equitably educating students with disabilities requires a school-wide effort and often some restructuring of resources (Lipsky & Gartner, 1996). Schools must undergo comprehensive changes which may include shifts in curriculum, instructional approaches, scheduling, teachers' roles, leadership support and priorities, and cultural norms (McLeskey et al., 2014a). Because of the school wide and multi-faceted changes that are required in order to truly implement inclusion, we argue that school efforts to include students with disabilities may be beneficially conceived of as a system. Foster-Fishman and colleagues define systems as "the set of actors, activities, and settings that are directly or indirectly perceived to have influence or be affected by a given problem situation" (2007, p. 198). By this definition, the collection of

resources that schools employ in order to support SWD in general education settings can be conceived as a system. We refer to this as a school's "system of support".

Taking a systems perspective allows us to simultaneously attend to the different elements that influence inclusion and explore how they function together. Scott (2015), adapting the work of Nadler & Tushman (1997), suggest that exploring the goals, formal organization, informal organization, people, and work/technology may help in understanding the different elements of organizational level systems and their interaction. First, systems have specific *goals*, and these goals shape the nature of the other elements in the system. The *work and technology* of the system refers to the main tasks needed to meet these goals, and the technology and tools that help to perform the tasks. The *formal organization* refers to explicit rules and structures for how work is performed in a system. *Informal organization* refers to emergent norms, values, and relationships. Lastly, *people* embodies the knowledge and skills of those working within the system and their fit for the tasks (Scott, 2015).

Consider the elements involved in crafting a system to support students with disabilities at the high school level. Although schools may vary in their specific goals related to supporting SWD, all must comply with federal guidelines related to providing SWD an individualized, free and appropriate public education (FAPE) and also be accountable to state and district performance goals for SWD on standardized tests. Accountability pressures aside, simply meeting the federal guidelines for educating SWD requires the work of a complex system of support. Special education federal policy guidelines (IDEA, 2004) require that schools create an Individualized Education Program or IEP for each SWD, which is the legal document that spells out what FAPE will look like given the unique needs of each individual child (Bateman, 2011). IEPs should be tailored to each individual child and must include measurable annual goals, a

plan for monitoring the child's progress toward those goals, a description of the specialized supports that the student requires, and a description of the extent to which the child will participate in general education classes and activities, among other requirements (IDEA Regulations). Crafting and adhering to a child's IEP requires careful planning and purposeful coordination and collaboration (Bray & Russell, 2018).

Imagine the complexity of developing and implementing unique IEPs for SWD en masse at the high school level. This is one of the driving goals of the "system of support". What system elements might a high school employ to work toward this goal? The *work and technology* of the system of support requires planning for how students will be supported in their classrooms and how teachers will learn about their unique educational needs. The school's *formal organization* will designate staff roles, responsibilities, and perhaps routines for communicating and collaborating. The *informal organization* encompasses teachers' personal relationships and attitudes toward inclusion, which are important facilitators for their productive collaboration (Friend et al., 2010; Mastropieri et al., 2005; Scruggs et al., 2007). Finally, the skills and expertise of the *people* in the system of support, specifically general and special educators, must be harnessed productively and efficiently.

We argue that systems of support at the high school level are inherently complex. According to Opfer and Pedder (2011), complex systems exist when "relationships between elements in the system vary in scale and intensity, come together in different combinations depending on the situation, are often reciprocal, and are always nested" (p. 379). The aforementioned elements of the system of support influence one another in dynamic ways. For instance, a school may invest in professional development in co-teaching to develop teachers' capacity (people), which may alter teachers' classroom practices (work/technology) and

ultimately improve educators' confidence and attitudes about supporting SWD (informal organization). Reciprocally, improved attitudes may foster greater teacher investment in collaborative planning and further strengthen classroom practices. Finally, the system of support is always nested within the existing and broader school, district, and state education systems. Therefore, analysis of complex systems requires attention to the interaction between elements or subsystems within the system as well as the nested and embedded nature of systems (Kuhn, 2008; Opfer & Pedder, 2011). Examining the interaction of elements in complex systems and the embededdness of those systems is important for understanding the ways in which the system may be enabled of constrained and how it can ultimately function to meet it's goal (Lemke & Sabelli, 2008).

3.2.2 Goal complexity in the system of support

As we described above, school "systems of support" can be thought of as the elements that work together to meet goals related to inclusion in a school. These goals are defined by federal, state, and district policies that specify legal and accountability requirements. We argue that, on top of these explicit goals related to inclusion, schools undoubtedly have other goals and pressures that will also shape the way they implement inclusion through their systems of support.

Even when organizations have clear and explicit goals, it is important to bear in mind that organizational goals are typically plural and multi-faceted (Scott, 2015). Natural systems theorists elevate the distinction between stated and unstated goals of organizations, arguing that exploring both types of goals is important for understanding organizational behavior and the potential of organizations to change and innovate (Brunsson, 1985; Perrow, 1961). Unstated or implicit goals surface in the behavior and decisions of organizational members. Some have even

argued that unstated goals are the most revealing for understanding organizational behavior, As organizational theorist Charles Perrow (1961) theorized, "the type of goals most relevant to understanding organizational behavior are not the official goals, but those that are embedded in major operating policies and the daily decisions of personnel" (p. 854).

Exploring the complexity of an organization's stated and unstated goals may be an especially salient frame for understanding how inclusion works through a "system of support" at the high school level. Researchers have long acknowledged the range of pressures and goals that high school educators face that may complicate the work of inclusion, including preparing students for college, careers, and independent living and accountability for student performance on high stakes tests (Cole & McLeskey, 1997; Dieker & Murawski, 2003; Schumaker & Deshler, 1988). Furthermore, leaders face the challenge of working within the norm of teachers' classroom autonomy (e.g. McLaughlin & Talbert, 2001) while encouraging general educators to open their classrooms to special educators as co-teachers (Dieker & Murawski, 2003). These pressures are likely to surface as implicit goals to which the system of support must also be responsive.

The purpose of this paper is to utilize a novel lens to understand the implementation of inclusion in high schools more holistically. Organizational and systems theory inform our conception of the implementation of inclusion happening through a "system of support". We explore the elements of this system, and how the interaction of these elements uncovers both stated and unstated goals of the system of support. We answer the following research questions:

1. How do the elements of a high school's system of support work toward the inclusion of students with disabilities?
2. How are efforts to implement inclusion complicated by goal conflict?

3. How does a high school navigate multiple, and at times, conflicting goals as it implements a system of support for the inclusion of students with disabilities?

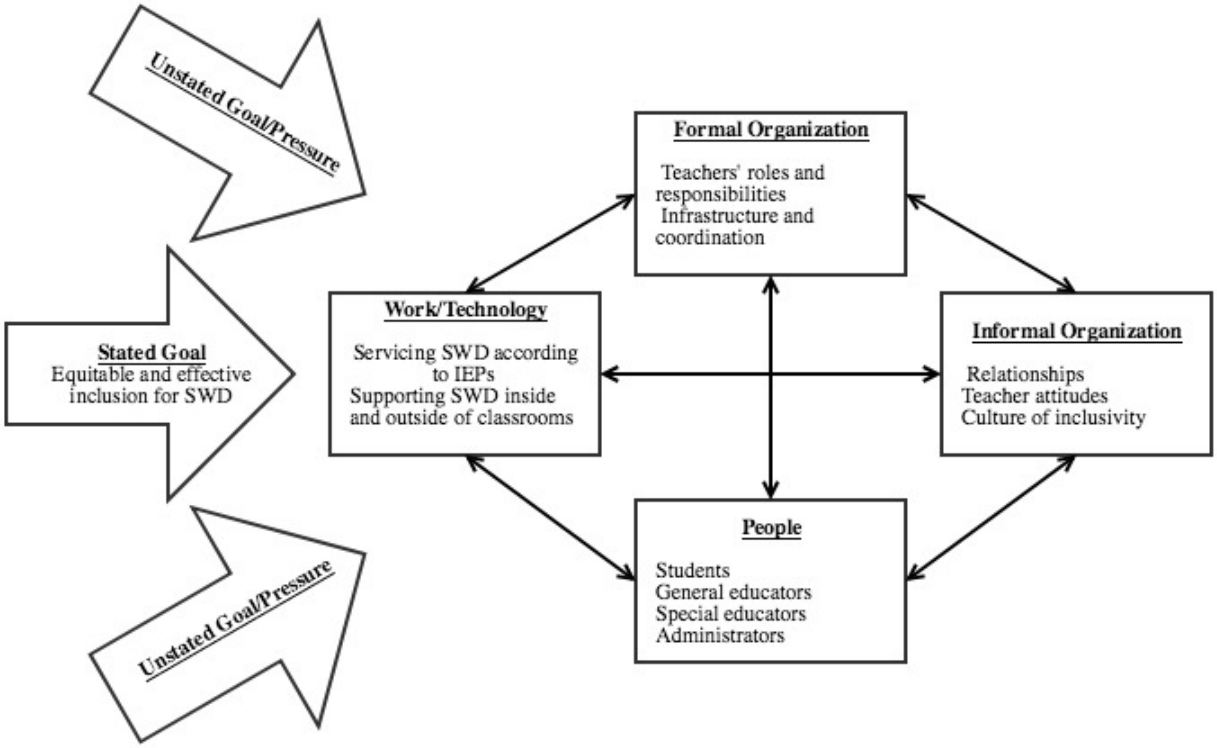

Figure 3. Goal complexity in the system of support

3.3 METHODS

3.3.1 Context

This paper is an in-depth, exploratory case study of Roosevelt High School (RHS). RHS is a suburban High School serving approximately 1,400 students. Around nine percent of students in the high school qualify for special education services. We selected this school because it offers a

unique opportunity to explore the system of support for students with disabilities in a school that appears to be successfully including students with disabilities. RHS exemplifies several features suggesting that students with disabilities are receiving equitable support in inclusive settings. First, almost all students with disabilities in the district are served in the high school rather than specialized settings. Second, the high school offers a range of settings for students with disabilities, from students in the life skills program who join their peers for certain social and non-academic classes, to students who are fully included and receive all of their instruction in general education settings. Third, students with disabilities in Roosevelt have achieved positive academic outcomes, performing well relative to the rest of the state on the state assessment.

Additionally, our research at RHS was enabled by our desire to learn from their program as well as the school and district leaders' willingness to engage in a research partnership that could potentially lead to new insights for improvement. We began working with RHS in September of 2014, and continued our research partnership for 4 years.

3.3.2 Data and analysis

Our analysis was exploratory, taking shape as we learned about the system of support from different stakeholders who played a role in the system at RHS. We modeled our phases of analysis after guidance from systems analysis. Systems change theorists contend that a critical step in systems analysis is to first understand the current system and its component elements. In order to do this, researchers must agree on how to bound the system, which requires clarity around what problem or goal should be addressed by the system and what actors or system elements are necessary to address this goal. After bounding the system and exploring its elements, it is important to analyze how different elements of the system interact and identify

any potential critical levers for change (Foster-Fishman et al., 2007). This guidance informed our phases of analysis, which we describe below.

During these phases of analysis, we were able to compare the system of support's work toward stated goals as well as uncover unstated goals and pressures by gathering participants' descriptions of the system of support and official documents (e.g. school handbook, presentation), as well as data related to how those in the system behave. While the system, in theory, is designed to meet stated goals, the behavior of system actors often reveals unstated goals as well (Brunsson, 1985; Perrow, 1961).

We sought to ensure strong construct validity throughout our analysis process by using a number of tactics. First, we utilize multiple sources of evidence to understanding the "system of support" for students with disabilities, including interviews, informal meeting notes, classroom observations, student achievement data, and analysis of school artifacts (e.g. schedules). We engaged in member checking at each phase of analysis, as we shared our learning through informal memos or formal reports with school stakeholders and revised our understanding as needed to ensure that we were accurately representing the school (Miles, Huberman, & Saldana, 2013). After member checking, we revised our initial impressions and adjusted our analysis plan based on input from school stakeholders (Brantlinger et al., 2005). These tactics bolster our confidence that our case study is an accurate representation of the phenomena that we intend to measure: the school's system of support for students with disabilities (Yin, 2013).

3.3.2.1 Phase 1: Map the system

First, we sought to get a holistic view of how special education worked at RHS by exploring the elements of the school system that work together to accomplish the school's stated goals related to inclusion. We conducted an in-depth interview with the high school's special education

coordinator at the beginning of the 2014-2015 school year. We selected the special education coordinator as a starting point for our analysis of the system because she functioned as both a teacher and administrator, had many years of experience at the school, and was considered by district and school leaders alike to have extensive knowledge of the school's special education program. The interview protocol was designed to surface different system elements by asking questions about staff roles, schedules, and coordination (i.e. formal organization), school climate and culture related to inclusion (i.e. informal structure), the ways in which students are supported inside and outside of their classes (i.e. work and technology) as well as the specific people who play a role in supporting SWD and the work of inclusion in the school (i.e. people). We also collected artifacts that were meant to provide an overview of how the special education program works at RHS, including the school handbook and Power Point slides from a presentation that the district created to give an overview of special education services.

This interview and artifacts provided basic information about elements of the system of support, and helped us to identify elements and ways in which they interacted that we wanted to learn more about. Teacher collaboration and specifically co-teaching emerged as a central aspect that influenced elements in the system of support.

3.3.2.2 Phase 2: Exploring co-teaching in the system

Next, we sought to learn more about how the elements of the system worked together toward co-teaching. We utilized a combination of data sources that could tell us about the behavior of the system, including classroom observations, focus groups, and informal meetings.

In order to get a broad understanding of what co-teaching looked like, we began by observing at least one co-taught class period for each pair of teachers who co-taught together in the fall of 2014, for a total of 15 classroom observations in the fall of 2014. Our observations

included classes from every major content area (e.g. English, mathematics, science, and social studies). We took rich and detailed field notes and then used a modified version of Murawski and Lochner's (2011) Co-teaching Checklist to evaluate the roles of teachers in co-taught classrooms, their interaction with students, general climate and culture, and prominent practices used. We compiled our ratings across observations to identify themes related to classroom practices across teachers.

Next, we held a focus group with co-teachers in order to get a sense of how co-teaching functions within the system of support, and the broader school system. For the first focus group, we invited all general and special educators that we had observed co-teaching. We asked the teachers to give their impressions of the co-teaching "best practices" from Murawski and Lochner's (2011) Co-teaching Checklist by rating them in terms of how well they feel they implement them in their practice and also in terms of their level of importance. Teachers indicated their personal level of implementation and importance of the co-teaching best practices by walking around the room and placing a sticker on a chart for each practice. This generated discussion about what was working well with co-teaching, what could be improved, and the system-level factors that constrain co-teaching. The teachers identified some practices and system level conditions that they felt were essential for co-teaching that were missing from our checklist. Overall, participants identified two major constraints for their collaboration as co-teachers that ultimately influenced their use of best practices: a lack of common time to co-plan, and the school-wide process for scheduling co-taught classes.

3.3.2.3 Phase 3: Exploring infrastructure and coordination

Next, we sought to learn more about these constraints related to infrastructure and coordination within the system. First, we held several informal meetings with the special education

coordinator to ask clarifying questions about these constraints; specifically, we explored how co-teaching is scheduled and the extent to which special educators have designated co-planning time. The special education coordinator explained that it was often not possible for co-teachers to have common planning time due to block scheduling and the many other responsibilities that teachers take on during their planning.

Nonetheless, there were three co-teaching pairs who demonstrated parity in their classroom roles during co-teaching despite the lack of co-planning time. We held a second focus group with these six educators in order to understand how they managed to co-plan in spite of these constraints. Interestingly, this focus group revealed that these teachers did not attribute their productive classroom collaboration to co-planning, but instead to their positive relationships and personality traits that they felt made them inherently more collaborative.

We also explored the school's scheduling process, which teachers and the special education coordinator felt constrained co-teaching. According to the teachers, this system influenced the number of students with disabilities they could reach, determined with whom they would co-teach, and shaped how they would spend their time. All of this, they felt, constrained the quality of support that they were able to provide to students with disabilities. To learn about this process, we interviewed three staff members who were described as playing a central role in determining how the school's scheduling process works: an assistant principal, the district director of special education, and a counselor. We also had several informal meetings with the special education coordinator to ask additional clarifying questions.

We organized our learning from these interviews/meetings into a scheduling process diagram, outlining the major steps of how student and teacher schedules are created and how co-teaching is distributed across the school. We shared this process with the interviewees in a

meeting to verify our understanding and make additional refinements. In addition to the interviews, we also collected artifacts to understand how the school schedule influenced teachers' work, and the extent to which SWD receive specialized support through co-teaching or other means. We analyzed the daily schedules of SWD and cross-referenced this with those of teachers in the fall and spring semesters of the 2015-2016 school year in order to get a sense of the extent to which students with disabilities had access to co-teaching and other support from special educators.

3.3.2.4 Phase 4: Theorizing about the system of support

Throughout our work with RHS, we created analytic memos to capture our learning and reflections about the work of the system of support and how stakeholders navigate multiple and sometimes conflicting goals and pressures. After all data collection was complete, we systematically reviewed these memos to look for emergent themes related to the goals that seemed to most strongly influence the system of support, navigating multiple goals, and conflicting goals. From these themes, we reviewed the entire data set we compiled over the years of our partnership with RHS, including interviews, artifacts, focus groups, and observations, to look for evidence supporting these themes as well as counter-evidence.

3.4 FINDINGS

The elements of the system of support at RHS interacted in complex ways; some of which supported the goal of inclusion, and some that surfaced the other pressures faced by the broader school system. Interestingly, few aspects of the system's formal organization helped to facilitate

inclusion. Instead, the system relied heavily on informal elements- specifically strong co-teaching relationships- to implement inclusion. In some ways, the culture of inclusivity and buy-in for co-teaching amongst some teachers allowed staff to overcome barriers presented by the formal organization. When we examined the decisions and behaviors that were part of the system of support, we found that the system had to be responsive to other goals beyond inclusion that constrained educators' work toward inclusion. Leaders and stakeholders had to navigate multiple and conflicting goals while implementing the system of support, including accountability pressures, teacher relationships and autonomy, and maintaining existing school systems. While positive student achievement outcomes for SWD suggested that the system of support was functioning successfully, we found evidence that the system was not optimal for providing individualized and specialized instruction for SWD. Instead, the system seemed to attain positive achievement outcomes by organizing resources to support remediation of tested subjects, even more so than supporting specialized instruction through the school's co-teaching model.

3.4.1 System interactions supporting goal of inclusion

We identified several themes related to how the elements of RHS's system of support work together toward the goal of inclusion for SWD. Notably, informal structures play a central role in facilitating inclusion in the system of support. First, various staff members described a strong culture of inclusivity in the school, which appeared to influence the system's work of supporting students inside and outside of the classroom as well as some aspects of the school's formal organization. Second, teachers' formal organizational assignment as co-teachers over the years contributed to their strong relationships, leading to more efficient work, better use of co-teaching practices, and improved teacher capacity for supporting SWD. Overall, school and district

leaders pointed to strong co-teaching relationships and improved high stakes testing scores as evidence that inclusion is working well in RHS.

3.4.1.1 Culture of inclusivity

A strong culture of inclusivity characterized RHS's informal organization. Several school leaders described how RHS was viewed by the community as having a strong and inclusive special education program. An administrator explained how leaders worked hard to meet this reputation but that, more importantly, inclusion feels like a benefit for the whole school community:

> There's a high level of expectation that… we're doing everything that we can to provide them (students) with the best opportunity within their capabilities. So, therefore, having those expectations from the community and is held administratively in high esteem that we carry through with that, so that's what we do. And it's the right thing to do. Most importantly, it's the right thing to do for kids… (Students with disabilities are) engrained in the culture of the school. Those kids, they can go in any classroom and there's no difference. You can see the kids react the same exact way as if any other student would walk in. They're very well accepted, and, I – I just think that it's- it's a good experience for everybody. Teachers included. I think it helps with the community of the school.

This strong culture of inclusivity was apparent in our classroom observations, suggesting that this aspect of the school's informal structure influences the work of teachers. One of the indicators of a strong culture of inclusivity is the integration of SWD and their peers or the absence of segregation in classrooms based on disability. We captured our impressions regarding which students may have IEPs based on the treatment they received from the teachers during classroom observations in order to understand if/how teachers may treat students differently. In twelve of our fifteen classroom observations, students in the classroom were integrated to the

extent that it was unclear which students had IEPs and which did not. Teachers tended to treat all students equally and with respect, with both teachers seeming to equally support students with and without disabilities. In fact, based on follow-up conversations with the teachers we realized that many of out initial impressions of students were incorrect. We observed general education students receiving one-on-one support from special educators, and SWDs participating in whole-class discussion, taking the lead in groups, and successfully working independently.

Comments from some teachers also suggest that the notion of inclusivity has impacted their classroom work. In a focus group, a co-teaching pair explained how they believe all students can benefit from adaptations and modifications; not just students with disabilities:

> Co-teacher 1*:* And what's nice is it's not just with the special education students (who are benefitted by co-teaching). It's any struggling student in there.
>
> Co-teacher 2: Any student.
>
> Co-teacher 1: Because we basically run our room as if everybody has an IEP, whether it's the gifted or whatever.
>
> Co-teacher 2: Yeah, everybody deserves a graphic organizer. It's just not required.

In addition to influencing the work of teachers, the culture of inclusivity also permeated to aspects of the school's formal organization. RHS strives to include all students in general education settings to the greatest extent possible while still meeting their individual needs. Indeed, an administrator noted that all SWD in the school with the exception of only 3 students with more severe disabilities receive at least some of their instruction in general education settings. Even when students received instruction in specialized settings, the school's formal plans for supporting SWD involved facilitating interaction between SWD and their peers by recruiting students to act as "peer helpers". As peer helpers, students may join their peers with

more severe disabilities in their elective classes to provide academic support and opportunities for social interaction. Additionally, students who volunteered as peer helpers participated alongside SWD in a class focused on helping students to develop social skills. We observed this class and noted that students seemed to have trusting and close relationships with one another, offering one another advice on how to resolve conflicts with family members and even offering one another rides to the upcoming school dance.

3.4.1.2 Strong co-teaching relationships

School leaders and staff members also suggested that strong co-teaching relationships were a major facilitator of successful inclusion at RHS. Admittedly, not all co-teaching pairings at RHS exemplified strong co-teaching relationships. We identified three out of the ten co-teaching pairs who we felt conveyed the strongest relationships based on our classroom observations of their co-teaching, and their comments during the subsequent focus group indicated that they believed co-teaching relationships in the school varied and that their pairings were the strongest. We will describe the implications for the variability in co-teaching relationships in the next section.

Teachers who felt that they had strong relationships with their co-teaching partner believed that this was facilitated by their being consistently paired together over the years. Their consistent pairing was no coincidence; leaders worked hard to adjust the schedule to try to make co-teaching assignments consistent. An administrator explained how keeping co-teaching pairs consistent seems to have helped special educators gain familiarity with course content, support collaborative planning, and overall build the strength and productivity of their relationship:

> And I do think that that time thing (that time facilitates co-teaching), because as I listen to them talk, if they've been doing it like three years together, some of the planning issues decrease and the content kinds of things decrease because everybody's familiar. So I do

think once it clicks or has a chance of clicking that keeping those same pairs is important and good.

Teachers echoed this sentiment by reflecting on their own experiences. They described how working together over time influenced their co-teaching; making co-planning and lesson execution more efficient. As a co-teaching pair reported during the focus group:

Co-teacher 1: We've been working together for how many years now?

Co-teacher 2: Four or five years.

Co-teacher 1: Four or five years and honestly, we just look at each other and we know exactly.

Co-teacher 2: Sometimes we finish each other's sentences.

Co-teacher 1: Right. So luckily we've done a lot of the same things for the last four years. So we talk about the changes mostly and use our time as efficiently as possible.

Another co-teacher addressed her partner:

I think what works well though is you and I have been co-teaching for the past several years so we can pick up – we can really just pick up and just tweak. We're at that point now where we can just tweak some things depending on the needs of our students. So we have a good solid foundation.

Teachers felt that their strong relationships and familiarity with course lessons and content helped to improve their capacity as teachers and ultimately to enhance their parity of roles inside the classroom. One teacher explained that she learned a lot from her special education co-teaching partner as they each brought different areas of expertise to the partnership. She offered, “I mean it's been enlightening in so many ways and having her guide me through

this. I have the content, you (co-teaching partner) have the how to do accommodations. It's very nice."

Our observations supported the notion that strong co-teaching relationships improve parity of roles that teachers assumed. Across our 15 classroom observations of the 10 co-teaching pairs, we observed instances where it was not evident who was the general educator and who was the special educator amongst these three co-teaching pairs with strong relationships. None of the other co-teaching pairs achieved this parity.

Finally, strong co-teaching relationships may ultimately reinforce the informal organization by exerting social pressure and creating buy-in related to co-teaching. An administrator suggested that when stories of success spread regarding the strong co-teaching relationships, it created a social pressure and, over time, a sense of buy-in amongst other staff regarding co-teaching:

> So, building that, where you have a group of teachers buying in, and they experience success with it. They start talking about the success with it- it starts getting out. I would say that the- I think the culture among our special education staff is a lot better now than what it was maybe, four or five years ago. I mean, I don't know what they say, but that's how I perceive it. And, a lot of it is because they are working together more. Um, I would like them to have more time. That's a challenge that we have, but um, I think that they have bought in. Maybe not all of them 100%, but they have, majority, bought in and say, "This is the expectation. This is how we do it." So there's, it's that soft pressure of- this is what my peers are doing, I have to move along with them.

3.4.2 Goal complexity in the system of support

In many ways, RHS's system of support resembles a natural system. Teachers and leaders at RHS worked tirelessly and creatively toward the goal of equitably and effectively including SWD. At the same time, the system of support did not exist in isolation; it was embedded and tied to broader school and district systems. Because of this, elements of the formal organization- primarily the school schedule- had to be responsive to multiple other goals and pressures and could not be entirely responsive to the goals of inclusion. As we describe below, this created barriers to teachers' work within the system of support that teachers and leaders were still grappling with. In this section we examine the other goals that emerged as we uncovered the broader pressures that the system of support had to respond to and the ways in which they come together to complicate the scheduling process.

3.4.2.1 Teacher relationships and professional autonomy

In trying to implement a co-teaching model, leaders at RHS struggled with how to respect and be responsive to norms of professional autonomy amongst teachers. Together, RHS teachers and leaders spoke to the persistent and powerful system influence of the informal organization, including teachers' attitudes, level of buy-in, and sense of professionalism. While longevity of relationships certainly helped some co-teachers to develop strong and successful relationships, teachers and leaders alike said that the fit of relationship or "synergy" between co-teachers was the single most important factor in determining if a co-teaching pair could work together productively. This sentiment came up repeatedly as we sought to understand what system-level elements may facilitate co-teaching. Teachers spoke to this during the focus group:

Co-teacher 1: There's synergy that needs to occur.

Co-teacher 2: Some match ups are better than others.

Co-teacher 1:Whenever you put two people together, you never know what a marriage is going to bring. I'm not disparaging anybody, but if you have personality conflicts that end up too wide a gap... I've dealt with it. So it doesn't work for everybody. I think that developing that relationship, you have to have two people with a similar philosophy and that's on us, I mean or me or whomever. But yeah, it's more difficult in some areas than in others. These happen to be some of our better marriages (teachers participating in the focus group).

In addition to the match of teachers' personalities and philosophies, leaders also expressed that not all teachers were bought-in to co-teaching. Two administrators explained that some general educators will still ask for co-teaching to be removed from their schedule, preferring instead to teach the class on their own. When school and district leaders spoke to this challenge, their responses reflected thoughtful consideration of how to walk a fine line between conveying their strong support for co-teaching and respecting the professional autonomy of their staff. An administrator explained his approach to managing this as a school leader:

We're working on some things, to make it more of a cohesive (co-teaching) model. As far as being higher level, as in like a top-down mandated thing- you have to walk a careful line here. Very sophisticated staff. Very professional, and they care. This is not a type of a place that will respond well to a club (top-down mandate). Moving these teachers is a lot- planting the seed, reinforcing the seed, embedding it throughout- and then a couple months later they're coming back saying it's their idea. You're like, yeah, that's a great idea! And that's ok. It's more like of a- a prodding and a, a molding to me.

That’s my approach toward it anyway. Somebody else might have a different one.

That’s how I handle it.

Another administrator echoed this challenge, suggesting that it has been something administrators have been grappling with:

> I think when we have (co-teaching) pairs that are not working, what are we going to do with that? And do we do schedules around that? Are we gonna do PD (professional development)? Or do we give up about (co-teaching)? Because when it clicks and works, I think it's a great thing. When it doesn't, I am not sure how we move forward with that, what that's gonna be.

This challenge had implications for the system of support the school provided. One respondent noted recent instances where general educators refused to work with a particular co-teacher or refused to co-teach in general, and special education student and teacher schedules were subsequently changed.

3.4.2.2 High stakes testing

In addition to respecting and navigating relationships with teachers, the RHS system of support also had to be responsive to accountability pressures from high stakes testing. In Pennsylvania, students take end-of course exams in Algebra I, Literature, and Biology to assess their proficiency. While proficiency on these exams is not yet a legally mandated graduation requirement by the state, this requirement is slated to become law in the 2019-2020 school year. At the same time, RHS leaders conveyed that preparing students for success on these exams was an important priority of the district, in part due to the district’s strong history of student performance on these exams, which contributes to the school and community’s desirability among parents.

Although preparing students for success on the Keystones was not expressed as a primary goal of the system of support for inclusion, we found that this goal largely directed the formal organization of the system; namely the way that special educators' roles and teaching responsibilities were allotted. First, while co-teaching was the school's official model for implementing inclusion, special educators were also assigned to teach remedial courses to help students achieve proficiency in Keystone-tested courses. These courses were taught by general educators or special educators, and were generally solo-taught rather than co-taught. The courses provided additional review and remediation related to Algebra I, Literature, and Biology and generally involved following a prescribed curriculum related to Keystone test content. Students may be assigned to a Keystone course as a preventative measure, to provide extra support before they take the Keystone, or for extra practice if they failed the Keystone. Remedial courses ranged from two days to five days per week. We observed several of these courses, and concluded that the courses could certainly provide valuable additional practice for SWD in general education content but did not necessarily afford specialized or individualized support. For instance, during our observation of a remedial Algebra course, all students worked through the same problems in a workbook and then went over the answers with the teacher. She explained after the class that this was the typical class format, and that working through the workbook was the main focus of the class.

For all of the special educators at RHS with instructional responsibilities (n=11), we examined how they spent their time based on their teaching schedules for the Fall and Spring semesters in the 2015-2016 school year. Each teacher had 3 instructional periods per day, and 1 planning period as the school's block schedule consisted of four longer periods per day. Out of the 33 non-planning periods worked by the 11 teachers, Figures 4 and 5 shows how their time

was allotted. We found that, collectively, special educators spent just as much time, if not more, teaching remedial classes as they did co-teaching classes, despite school leaders' stated commitment to co-teaching as a cornerstone of the system of supports.

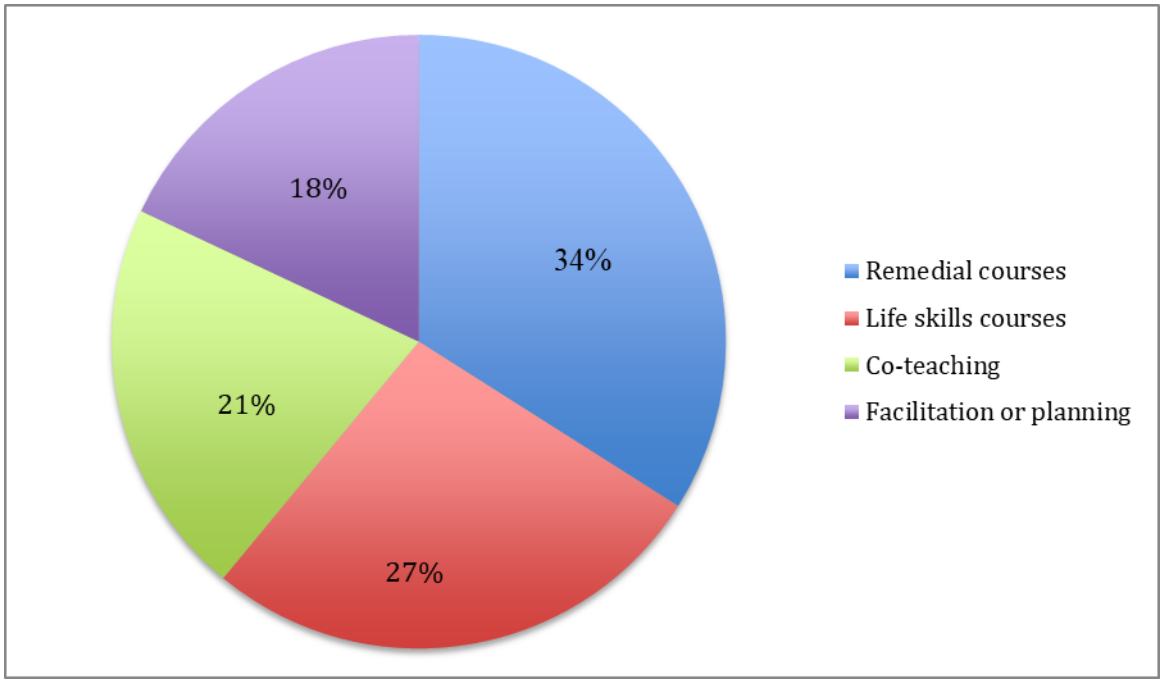

Figure 4. Special educators' use of time in fall 2015

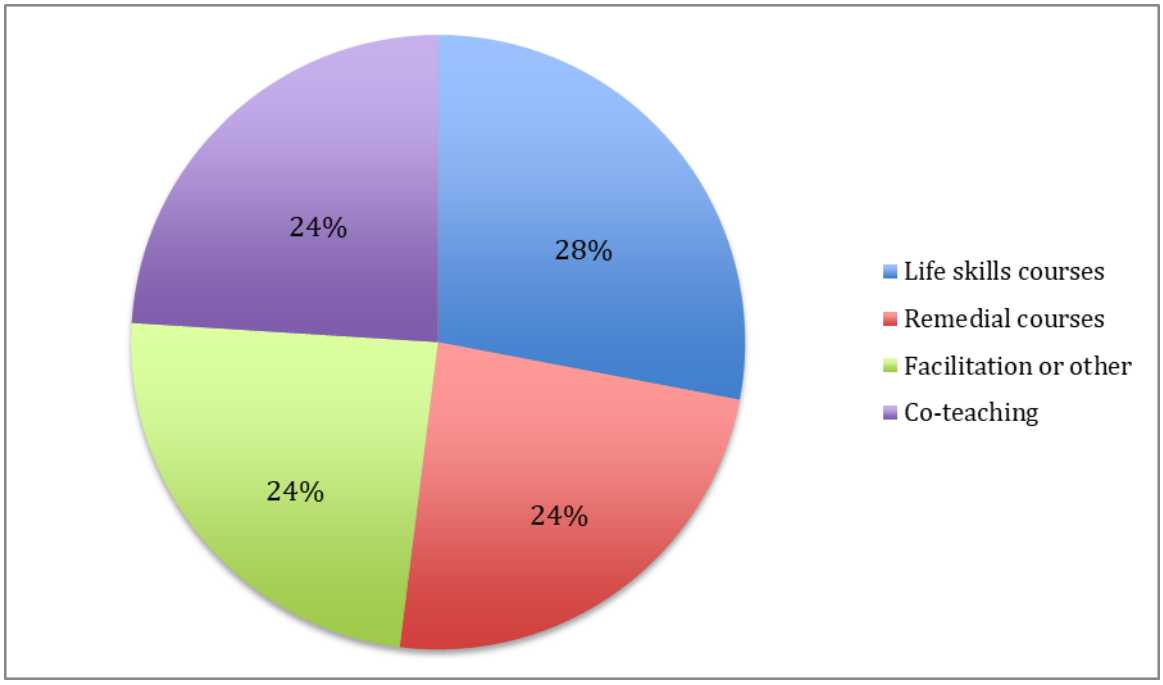

Figure 5. Special educators' use of time in spring 2016

In addition to the prominence of remedial course teaching in special educators' work, we also found that classroom supports for SWD were clustered in tested courses. If we consider only the goal of equitably and effectively including SWD, one might assume that co-teaching happened at all grade levels and content areas. Our analysis of teachers' and students' schedules revealed that this was not the case. Instead, a combination of teachers' relationships and tested Keystone courses seemed to influence which courses would be co-taught.

Students take the Literature Keystone after their 10th grade English course, the Algebra Keystone after their 9th grade math course, and the Biology Keystone after their 9th grade Science course. We explored students' schedules from the 2015-2016 school year to understand what specialized supports were available to them in their general education classes, either through co-teaching, being in a remedial course, or having an instructional assistant in their course. Teachers and leaders agreed that co-teaching offered students the most specialized and targeted support.

As Table 5 shows, co-teaching support was only sometimes available outside of tested courses, and co-teaching and remedial course supports were clustered around the tested courses. By the time students reached 12th grade, the only specialized support that they could receive in their general classes was the presence of an instructional assistant. Instructional assistants on average had less experience and formal training in supporting the learning needs of students with disabilities

Although the 9th grade science course, Biology, was also a tested course, it seemed that teachers' relationships and preferences related to co-teaching played a role in this course not being co-taught. Instead, an administrator explained that the special educator assigned to support the science department felt that he could be most impactful to students by teaching remedial courses.

Table 5. Types of support available in the general education setting

	English	Math	Science	Social Studies
9th grade	Co-teaching Remedial	Co-teaching Remedial	Remedial	Co-teaching IA
10th grade	Co-teaching IA	Remedial IA	Remedial IA	IA
11th grade	Remedial IA	Remedial IA	Remedial IA	IA
12th grade	IA	None	None	IA

Yellow = Initial course after which students take Keystone test

3.4.2.3 Scheduling challenges

As these pressures related to navigating teacher relationships/professional autonomy and high stakes testing illustrate, RHS's system of support had to be responsive to other goals of the broader school system in which it was embedded. Because of this, aspects of the formal organization were not always directly aligned with the goal of inclusion. In fact, in some instances the formal organization of the system of support presented barriers to inclusion. School leaders and teachers alike agreed that the largest barrier to successfully including SWD at RHS with the co-teaching model was the school's scheduling process. We explored the scheduling process more deeply by interviewing key stakeholders involved in the process, visually mapping it to check our understanding, and holding follow-up meetings with the stakeholders to clarify our questions. As we learned, the process of creating RHS's school schedule was extremely complex, interrelated, and beholden to a number of system goals beyond inclusion. Additionally, many considered the scheduling process a key lever for the success of the inclusion program and co-teaching model as it determined how teachers' time and expertise was to be allocated and the extent to which students would receive direct support from teachers day-to-day.

One of the pressures that influenced the schedule was navigating teacher relationships. School leaders acknowledged that trying to keep successful pairs of co-teachers together and honor others' desires not to co-teach made the already difficult scheduling process even more complex. Nonetheless, leaders felt that it was essential to honor teachers' relationships if co-teaching was to be successful. An administrator explained:

> Because the schedule is hard enough, trying to get kids slotted in without having the whole personality kind of thing. But it really – I think I'm more convinced than ever that those sort of interpersonal kind of things are really, really important.

Furthermore, pressures related to the Keystone test also drove the creation of the school schedule. As we described previously, tested courses were prioritized for co-teaching. Another administrator explained that the decision to allocate co-teaching to tested courses was not easy and was always a matter of weighing pros and cons:

> … You have the pressures of- I might have a group of Seniors that, this co-teaching, it would be good and it would be what's best for them, but I have a group of Sophomores that are in a tested area- And I have to make that decision against that decision. So, that's- And you can't (just do both). Or, you- you know, I've tossed around, ok, you (special education co-teachers) go here three days and you go here two days, or whatever- I've- but you don't get the consistency that you need that way. So I- I, you know, I've ruled it out. I just, I don't think it's good. I don't think it's healthy, and you know, you're spreading it out but you're not doing a thorough job.

Additionally, school leaders and teachers acknowledged the difficulty of assigning SWD to classes, co-taught or otherwise. School leaders struggled to balance the needs of students with the concerns of faculty. For example, leaders and teachers alike noted that they did not want to put too many SWD in one class in order to ensure that they can receive sufficient support and also to be fair to teachers who are evaluated, in part, based on their students' academic achievement. On the other hand, clustering SWD and other students who may need extra support in co-taught classes could potentially maximize the number of students that special education teachers could reach. An administrator explained this challenge:

> The pressures that are placed upon everybody for scores, how do you disperse the kids to where you're putting enough (SWD) in a class but it's not a class that's overwhelmed with special needs and you're servicing that, and your trying to meet them, you know, to

where you got the gross standard, and then you have the proficiency standard. So it's, you know, it's a scheduling nightmare.

Despite their strong commitment to including and supporting SWD in general classes, teachers also lamented the difficulty that can arise from clustering SWD and other students needing extra support in co-taught classes, explaining that this could be a disincentive for general educators to want to co-teach:

Co-teacher 1: The other thing that happened sometimes is that, with all due respect, sometimes people become a dumping ground when you're co-teaching. So that class gets very loaded with IEPs.

Co-teacher 2: Not just IEPs, but –

Co-teacher 1: Emerging learners.

Co-teacher 2: Yeah, if you failed the class, let's see if this will help you. So I think co-teachers get burnt out is what I've been told on numerous occasions. We love you, but.

Co-teacher 3: We're trying to keep the co-teacher pairs consistent… But you hate to – and this goes for special ed as well as regular ed – you hate to pigeon hole them into that class all the time because you know you are getting –

Co-teacher 2: You need a break.

Finally, the scheduling process had to fit within the formal organization of the broader school system. One salient element of this system was the school's use of a block schedule. The block schedule consisted of four longer periods per day, with courses changing each semester. On the plus side, students reported to school leaders that they felt this schedule better prepared them for college, and that they enjoyed having a fresh start. Although courses were condensed to only one semester, the school used this opportunity to offer extra remedial courses before

students took a Keystone course or to give students extra remediation after failing the Keystone in the same year. On the other hand, the block schedule required that the school repeat the complex scheduling process twice per year instead of just once as a traditional schedule would require. Additionally, special educators felt that the block schedule constrained them in their use of time. With four longer periods in the day, and one devoted to planning, they felt confined by only being able to support the students in their three assigned courses (whether they be co-taught or remedial). Special education teachers expressed that the students in their assigned courses rarely overlapped with those on their caseloads (for whom they monitored IEP implementation), and several teachers expressed frustration at being assigned to co-taught classes with as few as one SWD. On top of locking them in to supporting one class for longer periods of time, teachers felt that the block schedule constrained co-planning opportunities. Most teachers reported that their one longer block for planning rarely coincided with their co-teaching partners, making co-planning difficult.

Overall, it was the combination of these pressures and broader system constraints that made scheduling challenging and sub-optimal for supporting the school's inclusionary goal. Our process of speaking to teachers and different stakeholders in the scheduling process revealed that they were committed and thoughtful in their efforts for improvement, but were at a loss for a feasible solution to make the scheduling process better support inclusion in RHS. When asked about what the scheduling process would look like in an ideal world, an administrator reflected:

> Um, (pause), you know, outside of being able to just magically meet every kid's need, you can't do it because you have constraints, you have a schedule, you have so many teachers that have so many periods that have uh, you know, you're only allowed to teach x, y, or z, and, you know, this particular year you have more kids that are in need than

what you have teachers that can adequately service. So, um, you know ideally if I had a magic bullet, if I could just do whatever I could do to make it right for kids, that would be my scheduling magic bullet.

3.4.3 Navigating goal complexity in the system of support

How did RHS navigate these multiple and conflicting goals while still managing to implement a system of support for including SWD? Systems theory suggests that those who design systems for policy implementation are driven to optimize the system output (Simon, 1968). In the case of RHS, the output of the system of support that seems to be most valued and prioritized is student achievement and growth on high stakes testing. Evidence suggests that poor scores were an impetus to change the system years ago when the school shifted to a co-teaching model. At the time of our study, leaders cited strong scores to suggest that the system had become successful. An administrator explained that lower test scores have been the impetus for shifting to a more inclusive model using co-teaching:

> …When I started five years ago, we were doing very limited inclusion of students with disabilities in core academic subjects. And our special education PSSA scores were terrible. So it was a pretty easy sell (changing to a more inclusive system, with a co-teaching model). The district, I think, was looking and thinking about doing something different and so – and the timing was perfect because it was a very topical kind of thing in the county. So there was lots of support, lots of talk about it, and it was pretty easy convincing other people that that would be a good thing to try. And we have had great success doing it. So that's why we have continued to embrace it and roll it out year after year.

By all accounts, RHS was very successful in supporting SWDs based on their performance on high stakes tests and levels of student growth for historically underperforming students (the state reporting subgroup which includes SWD) compared to the rest of the state. Administrators cited these test scores, which they say show a significant improvement for SWD, as evidence that the more inclusive, co-teaching model is working. The performance of SWD on high stakes testing seemed to indicate that two important goals of the system of support were being met: the goal of inclusively educating SWD, and the accountability pressures related to high stakes testing.

Despite this evidence of success for some system goals, we found substantial evidence suggesting that the system of support was not functioning optimally for including SWD with regard to other goals of inclusion. The primary goal of special education for which all schools are legally accountable is to ensure that SWD receive a free and appropriate public education that is tailored to their individual needs (IDEA, 2004), and through which they have the opportunity to meet challenging objectives (Endrew F. v. Douglas County School District). Several aspects of RHS's system of support did not function optimally for providing appropriately tailored and individualized instruction to SWD.

First, the school's process for creating student and teacher schedules was driven by other factors that took precedent over student need, including teacher relationships, tested courses, and the school's block schedule. With these numerous, competing pressures at play, we found that the process for creating schedules was not systematic in ensuring that SWD were supported based on their needs. Counselors in charge of the scheduling process utilized the computerized scheduling system to schedule most SWD into their classes. While administrators tried to shift student and teacher class assignments to ensure that special educators could support an optimal

number of SWD in co-taught classes, this was often not possible due to the complexity and interconnectedness of other competing demands. When we reviewed student and teacher schedules in the 2015-2016 school year, we found that of four of the twelve co-taught classes offered in the fall semester only served one student identified as having a disability. Special educators and a school administrator expressed frustration that teachers were devoting one 80 minute period per day co-teaching a class that would only support one SWD, while many SWD sat in non-co-taught classes.

Second, the system of supports provides limited time for teachers to co-plan for how to appropriately tailor instruction to meet the needs of SWD in general education classes. Teachers' accounts describe the RHS system of support as one in which co-teaching is maintained by the personal efforts and commitment of a select group of teachers rather than by a purposefully crafted system of support. Despite their efforts and commitment, the co-teachers who were viewed as having successful partnerships expressed some frustration at the constraints limiting their collaboration. Teachers felt that they were working hard and supporting students, but that their co-taught instruction could be improved with more time for co-planning. One co-teacher expressed,

> …You know right now it's like I feel like I'm just like – I don't want to say skimming by because I'm putting a lot of time in it, but like I feel like everything I do could be better. And I feel like if you had the time to work with somebody, then it could actually get better.

Another co-teacher expressed that her previous strategy of planning through quick conversations in passing was now insufficient as the teachers had a new class with more learning needs:

> …This semester, now it's like in the five minute time period between class change, we're standing in the hall going, so we'll do this and this and this. And it's like okay, but we're finding the group of kids that we have, that's not working. We need more time because we got a really difficult (class of students with a high level of need).

Indeed, during the focus group, co-teachers described co-planning sessions that were more focused on coordination and logistics than planning for specialized instruction and targeted teaching strategies. Although the lack of co-planning time highly restricts the extent to which teachers can tailor instruction to meet SWD unique needs, comments from an administrator suggest that leaders' expectations for what co-planning should entail are tempered due to other system pressures:

> …My expectation is they're (co-teachers) in communication, they're working together when possible, there are only so many hours in a day, there's only so many hours that they're here, and I don't know if you've seen the pressures in this place, it's- It's very, very different. This is like no other place that I have been. So having said that, am I going to sit down and make you two work together, and hold a club over your head for 80 minutes every other day, or whatever, when you don't have the co-planning time. But um, make sure that you're in communication and make sure that you're spending, um, I don't think it's unreasonable for them to spend, you know, about 45 minutes to an hour a week going back and forth to where they're nipping and tucking and they're in communication about the lessons.

The administrator's account suggests that a surface-level focus on coordination and logistics during co-planning may be acceptable by administrators as a necessary tradeoff given other system pressures.

Finally, our observations of co-taught classes revealed that co-teachers rarely employed best practices for co-teaching. One such best practice involves general and special educators using a variety of instructional approaches (e.g. parallel teaching, station teaching, team teaching) in order to more fully leverage having two educators with unique expertise in the classroom. Across fifteen observations of co-taught classrooms, we observed only three instances of co-teachers using different approaches beyond the general educator leading the class and the special educator assisting (i.e. "one teach, one assist"). Co-teaching experts argue that this approach should be used only sparingly, fully utilize educators' capacity to tailor instruction to student needs (Mastropieri et al., 2005; Scruggs et al., 2007). It is not surprising that this approach is used so heavily in RHS's co-taught classes, as teachers have such limited opportunities to co-plan.

How do we reconcile the positive system output of high achievement scores of SWD with evidence of suboptimal system performance? If we look at the way special educators are utilized in the system, it seems unlikely that their role in co-teaching is driving student success on high stakes tests. Instead, this success seems to come from the system's allocation of resources to support high stakes testing by offering targeted remedial courses and prioritizing the co-teaching of tested courses. These shortcomings of the system of support suggest that it may be designed to optimize SWD performance on high stakes tests, instead of and perhaps at the expense of supporting SWD in accessing the broad, general curriculum in a way that is tailored to their needs.

3.5 DISCUSSION

A systems perspective is apt for describing the complex work of including SWD in high schools. The specialized support that students are provided is largely enabled and constrained by numerous interconnected elements of broader school and district system, and schools are beholden to multiple and sometimes competing pressures. When it comes to improving systems, "leveraging change in one part will lead to the desired outcome only if concurrent shifts happen in the relational and compositional elements of the system" (Foster-Fishman et al., 2007, p. 199). We argue that at RHS, change happened in just the right system elements in order to influence the outcome that was most valued and prioritized by school and district leaders: improved student achievement scores on high stakes tests. While the system was successful in achieving this outcome, other outcomes related to inclusion were more difficult to attain through the system. Namely, teachers were strained in their ability to provide SWD targeted and individualized instruction in their general education classes.

3.5.1 Limitations

While we offer broad theoretical and practical implications from this study, several limitations are important to bear in mind when interpreting our findings. First, this study is a detailed case study of one high school that is in many ways not representative of high schools across the country. RHS serves a relatively wealthy population of students and likely has access to more financial resources than an average school. Additionally, students at RHS have demonstrated markedly higher achievement levels compared to the state average. In spite of these characteristics, RHS provides a compelling case for illustrating the challenges and complexity of

implementing inclusion, which are challenges that schools with far fewer resources will likely have to contend.

Finally, our data collection did not encompass the broad range of outcomes for SWD that we might expect could be influenced by a system of support. Aside from Keystone scores, which were publically available at the school and subgroup level, we have little idea of how SWD or their peers fared in non-tested courses and in broader, non-academic areas (e.g. independent living skills). Comments from teachers and leaders suggested that, overall, SWD fared well in general education classes across the school. Additionally, the school boasted high graduation and post-school enrollment rates for SWD and their general education peers alike. Nonetheless, an objective measure of student achievement in non-tested subjects could provide additional insight into the extent to which the system of support benefitted students broadly or primarily in tested courses.

3.5.2 Implications for special education research and practice

While decades of special education research have acknowledged the school-wide and systemic shifts required to implement inclusion (e.g. (Baker et al., 1995; Fuchs & Fuchs, 1994; Lipsky & Gartner, 1996; McLeskey & Waldron, 2006; McMaster, 2013; Theoharis & Causton, 2014), we argue that this has not necessarily altered the course of research in the field. Employing a systems perspective to study the implementation of special education policies stands to address this gap in a number of ways. We pose questions from systems change framework that, if explored in future special education research, could provide valuable insight for improving the implementation of inclusion.

3.5.2.1 Bounding the system

Bounding the system of support for implementing inclusion is not so straightforward. Schools must grapple with complex policy messages regarding what goals to prioritize when supporting SWD. Accountability policies (NCLB, 2001; ESSA, 2015) send the message that the goal of adequately supporting SWD can be measured in terms of student achievement scores on standardized tests. Alternatively, special education federal policy conveys different goals and notions of success for SWD (Russell & Bray, 2013). On a rudimentary level, IDEA requires that educators comply with legal guidelines in crafting and carrying out students' IEPs. However, the spirit of the law is more complex, calling for all SWD to have opportunities to meet challenging objectives by receiving an education that is tailored to their individual needs (Endrew F. v. Douglas County School District).

Exploring how schools and districts conceptualize their systems of support for implementing inclusion, including what goals they prioritize in bounding the system, may provide valuable insight into policy implementation and the unintended consequences of policies. Our findings indicate that when accountability targets are prioritized as the system goal, the elements in the system work together to meet this goal. When elements of the system work toward supporting SWD in tested courses, this could inadvertently detract resources from teachers' ability to provide individualized support to students as they access the general curriculum more broadly.

3.5.2.2 Enduring system patterns that impede change

Lastly, a systems perspective can provide a fresh lens for exploring persistent and well-documented problems of implementing inclusion. Such persistent challenges to implementing inclusion in high schools that are underscored in our study include teacher relationships, lack of

time for co-planning, and the complexity of school schedules (Dieker & Murawski, 2003; Harbort et al., 2007; Simmons & Magiera, 2007; Zigmond, 2006). Exploring these persistent challenges from a systems framework can surface their relationship to other elements in the system and provide insight about their resistance to change and other system elements that could be levers for change (Foster-Fishman et al., 2007). For instance, a culture of respecting teacher autonomy contributed, in part, to scheduling challenges at RHS as leaders strove to convey respect for teachers' professional autonomy but unintentionally perpetuated some teachers refusing to co-teach. This suggests that school culture and teachers' professional autonomy could be important links to scheduling in the school system and candidates for intervention and improvement.

3.5.2.3 Identifying levers for system change

Elements of the system that are highly interconnected have potential to act as levers to trigger system change and improvement (Foster-Fishman et al., 2007). In the case of RHS, the school scheduling process surfaced as one such element; highly connected and constraining to the rest of the system of support. Some have specifically explored the impact of different scheduling options on inclusion, suggesting that block schedules in high schools may facilitate better classroom supports for students in the co-teaching model (Weller & McLeskey, 2000). However, we know of no studies that systematically examine high school scheduling processes more broadly and their relationship to the implementation of inclusion. Future studies could provide valuable lessons related to improving systems of support for inclusion by exploring high school scheduling processes as a potential lever for system change.

3.6 CLOSING

Even with a high level of resources, strong commitment from teachers, and thoughtful leadership, implementing inclusion at the high school level is wrought with challenge and complexity. High school systems for supporting SWD are accountable to a wide variety of goals and pressures and are embedded within existing school and district systems. RHS's system of support illustrates how high school systems of support can simultaneously be successful at improving the achievement of SWD on high stakes tests and yet fall short of providing those students an individualized instructional experience. A systems perspective illuminates the inherent complexity of implementing inclusion, while providing a frame for conceptualizing improvement. Clarifying goals for inclusion and identifying enduring patterns that impede systems change can help researchers and practitioners reveal potential levers for improving high school systems of support.

4.0 PAPER 3:

EXPLORING THE DISTRIBUTION, ACCESS, AND ACTIVATION OF ORGANIZATIONAL RESOURCES TO SUPPORT TEACHERS' COLLABORATION AROUND MATHEMATICS INSTRUCTION

Peer collaboration can support teacher efforts to improve their math instruction, but teachers' interactions with colleagues are not inherently productive. We utilize a mixed methods social network approach to explore how school and district distribution of resources to support teacher collaborations around math instruction relate to their likelihood to draw upon and utilize these resources to enhance their professional learning. We found that the distribution of coaches with mathematics expertise as well as math professional learning communities in which teachers can collaborate with grade level colleagues relate to teachers' activation of resources for their professional learning. However, the design of these supports matters for the extent to which collaboration may be conducive to teacher learning. Understanding how school and district structural factors relate to teachers' utilization of resources is an important step for designing more productive collaborative opportunities and realizing their potential for teacher learning.

4.1 INTRODUCTION

Nationwide, district and school leaders grapple with how to support math teachers in improving their instruction to align with more rigorous, conceptually focused vision of math teaching and

learning. This vision was initiated, in part, by the National Council of Teachers of Mathematics (NCTM, 1989) in their call for math instruction to move away from procedural fluency and emphasize reasoning. It has since evolved to a set of mathematical teaching practices that promote reasoning, problem-solving, facilitate mathematical discourse, and build a foundation of conceptual understanding (Principles to Actions, NCTM, 2014). This shift in vision of math instruction is accompanied by a policy push for states to adopt more rigorous standards that will better prepare students for college and careers in the 21st century (e.g. Race to the Top, 2009). Many states have either adopted the Common Core State Standards for Mathematics (CCSSM) or revised their standards substantially in ways that align with the focus on conceptual understanding and problem-solving laid out in the CCSSM.

While states set the vision for what instruction should look like by adopting reformed standards of teaching and learning, it is ultimately up to districts and schools to craft local policy strategies that will help teachers make these instructional shifts. Strategies that leverage teachers' collaboration, such as professional learning communities (PLCs) and instructional coaches are increasingly common. Decades of educational research have established the importance of teacher collaboration for improving educational outcomes (A. S. Bryk et al., 2010; McLaughlin & Talbert, 2001). Teachers' collaborations can contribute to improved educational outcomes in a number of ways including by providing opportunities for teachers' professional learning (e.g. Horn & Kane, 2015), build trust and social capital that helps teachers feel comfortable taking risks with their practice (e.g. Moolenaar, Sleegers, & Daly, 2011), and influence teachers' attitudes and beliefs about reforms (Cole & Weinbaum, 2010; Siciliano, Moolenaar, Daly, & Liou, 2017)).

At the same time, not all collaborative efforts are inherently productive (Hargreaves, 1994; McLaughlin & Talbert, 2001). Policies that require the creation of compulsory teacher

communities can lead to "contrived collegiality", as opposed to communities that are more organic and teacher-driven, which generally does not lead to meaningful or lasting educational change (Hargreaves, 1994). Teacher collaborative communities can also perpetuate traditional ideas of instruction (McLaughlin & Talbert, 2001) and may promote resistance to change if the group norm is to avoid conflict (Achinstein, 2002). Teachers' collaborations may be the context for teacher learning and spreading desired instructional changes, an added perfunctory duty, or a mechanism for maintaining the norm.

Districts and schools implement local policy strategies that intentionally or unintentionally influence teacher collaborations. Such policies may influence the nature of teacher collaborations as well as the resources that teachers have to draw upon during their collaborations. For instance, district or school leaders may determine how instructional coaches are selected and how they will support teachers which shapes how teachers access valuable expertise related to instructional reforms (Coburn & Russell, 2008; Penuel, Riel, Krause, & Frank, 2009). Districts and schools may also institute required PLCs or work groups (e.g. grade level teams), which shape teachers' formal interactions about their practice (Coburn & Russell, 2008) and can be an important venue for working out what reforms will look like in practice (Daly et al., 2010). Additionally, leaders can introduce routines of interaction that shape the substance of what teachers discuss during their interactions. Routines have the potential to focus teachers' collaborations on substantive areas related to instructional improvement and help teachers to learn about the relevant expertise of their colleagues (Cynthia E Coburn et al., 2013). All of these local strategies have potential to shape teacher collaborations and their potential for generating desired instructional change, for better or worse.

By exploring the relationship between local policy strategies and the ways in which teachers access and activate valuable support through their collaborations we address a critical

disconnect in the field of mathematics education research. Bannister (2018) has argued for more research emphasizing math teachers' communities, arguing, "Persistent disconnects within and among research, practice, and policy are limiting the capacity of the most promising strategy for humanizing mathematics teaching and learning in schools" (p. 126). Through a rich, mixed methods inquiry we trace the relationship between the local policy strategies employed by schools and districts to influence teachers' collaborations related to mathematics, the extent to which teachers access these supports, and their potential for influencing teachers' professional learning.

4.2 THEORETICAL FRAMEWORK

Our analysis focuses on teacher collaborations as a critical context for understanding the implementation of instructional policies (McLaughlin & Talbert, 2001). Implementing instructional policies such as new standards for mathematics learning and a reform vision of instruction ultimately falls to teachers, who are both the targets and agents of reform (Cohen, 1990). Implementation plays out in the classroom, but also in teachers' day-to-day collaborations with one another. Teacher collaborations can be a vehicle for teachers' professional learning and instructional improvement, depending on the content and nature of those collaborations (Coburn et al., 2013; Coburn, Russell, Kaufman, & Stein, 2012; Horn, Garner, Kane, & Brasel, 2017; Horn & Kane, 2015; Horn & Little, 2010; Little, 2002). At the same time, teachers' collaborations do not happen in a vacuum. They are shaped by the broader school, district, and state contexts in which teachers are embedded (Cynthia E Coburn & Russell, 2008; Spillane, Gomez, & Mesler, 2009). Thus, truly understanding teacher collaborations related to policy implementation requires simultaneous attention to their micro-level interactions with colleagues

and the macro-level features of school and district context that shape those interactions.

We utilize Spillane, Gomez, and Mesler's (2009) framing of organizational resources for policy implementation as the foundation of our theoretical framework. In the remainder of this section, we describe three macro-level "organizational resources" that districts and schools may leverage through local policy strategies with the purpose of improving instruction. We then describe how social network theory provides conceptual and analytic tools for understanding how teachers may access and activate these organizational resources through their micro-level interactions. Figure 6 provides an overview of our theoretical framework.

4.2.1 Organizational resources for collaboration

Spillane and colleagues (2009) posit that there are four organizational resources that enable and constrain educators' interactions and ultimately their implementation of policies: human capital, social capital, organizational routines, and tools and technology. Human capital refers to the knowledge, skill, and expertise of individuals in an organization (Coleman, 1988). Social capital refers to the resources embedded in the relations amongst individuals, such as feelings of closeness and/or goodwill (Lin, 1999). Organizational routines foster repeated and predictable patterns of interaction that enable efficient, coordinated work in organizations (Feldman &

Pentland, 2003). Lastly, technology and tools structure interactions and are often utilized to streamline and coordinate work (e.g. email, instructional or administrative software). Because the focus of our study is on teacher collaboration, we emphasize human capital, social capital, and organizational routines in our analysis as teachers' utilization of these resources is inherently collaborative.

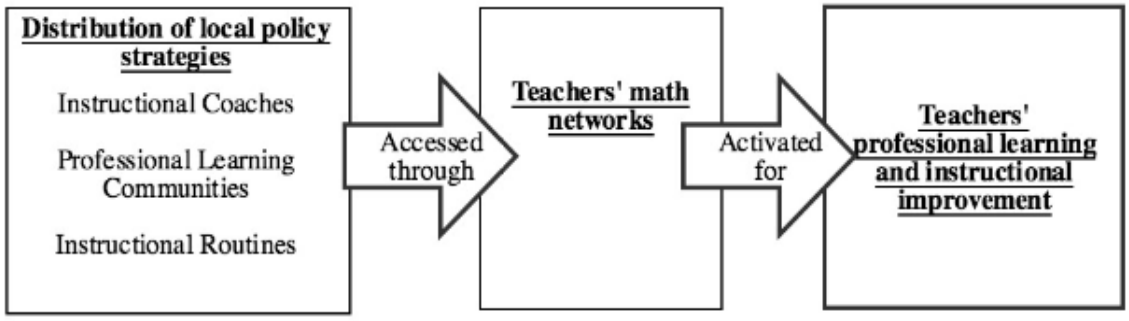

Figure 6. Leveraging organizational resources as policy strategies to promote teacher learning

4.2.1.1 Human capital

Districts and schools regularly utilize human capital strategies to try to spread innovations and improve teacher practice and student outcomes (Smylie, 1997). We focus on the roles of instructional coaches as one specific human capital strategy that may be utilized to help teachers improve their instruction. Coaches are meant to support teachers by infusing specific expertise related to content and/or general instructional pedagogy (Galluci, Van Lare, Yoon, & Boatright, 2010; Taylor, 2010). The design and implementation of instructional coaching varies greatly (Coburn & Woulfin, 2012; Galey, 2016; Marsh et al., 2008; Mangin & Dunsmore, 2015), with mixed results in terms of effectiveness of improving teachers' practice and student outcomes (Kraft, Blazar & Hogan, in press). We contend that understanding how teachers interact with

instructional coaches is an important part of understanding their collaborations related to instructional improvement.

4.2.1.2 Social capital

Professional learning communities (PLCs) are a popular policy strategy employed by schools and districts to leverage social capital amongst teachers in an effort to improve educational outcomes. The promise of PLCs is rooted in a sociological view of learning, that conceptualizes teacher learning as participation in communities of practice (Lave & Wenger, 1991; Wenger, 1998). In their review of literature on PLCs, Vescio and colleagues (2008) emphasize their potential for supporting teacher learning and practice improvement because knowledge of practice is situated in the lived experiences of professionals and best developed through reflection with others that share the same experiences. Through their collegial interactions, teachers may engage in joint planning and reflection on instruction and student learning, which in turn can help to deprivatize practice and develop a sense of colletive responsibility for improvement (Bryk, Camburn & Louis, 1999; Little, 2003; Louis, Marks & Kruse, 1996; Newmann et al., 1996). In studying reform implementation, Daly and colleagues (2010) found that grade level teams are a particularly salient form of professional community for teachers, but the extent to which they are a resource for implementation varies significantly depending on the structure of collegial interactions in these teams (Daly, Moolenaar, Bolivar & Burke, 2010). We theorize that grade level colleagues are salient because many schools structure PLCs so that teachers have regular time to meet with colleagues teaching the same mathematics content and curriculum, and that this shared experience creates potential for the activation of social capital.

4.2.1.3 Organizational routines

Finally, schools and districts often utilize routines to infuse structure and guidance into teacher collaborations. For instance, school leaders may introduce a data review routine to guide weekly meetings, or a quarterly routine in which colleagues observe one another teaching and provide targeted feedback. Routines influence the content and nature of teachers' interactions by encouraging teachers to interact with more expert others and focusing interactions on salient features of teaching and learning (Coburn & Russell, 2008). By influencing interactions, routines can stabilize practice in organizations by making sure that work unfolds predictably over time, but they can also be used to spread change (Feldman & Pentland, 2003; Sherer & Spillane, 2011). We theorize that instructional routines involving administrators may provide valuable resources for helping teachers to enact more rigorous math instruction. Principals can play a key role in instructional improvement by directing resources toward teacher professional learning and development (Bryk et al., 2010; Franz Coldren & Spillane, 2007). Many districts require that principals observe teachers once or twice each year and provide feedback on their instruction (Weisberg et al., 2009). Nonetheless, few teachers report that principals regularly talk with them about their teaching (Goldring & Cohen-Vogel, 1999). Some districts or individual principals have enacted more regular cycles of observation, reflection, and feedback, at times enacted with groups of teachers, that constitutes a routine that is a resource for instructional improvement. Routines that promote substantive interaction between principals and teachers are potentially consequential. For example, Moolenaar and colleagues (2010) found that the more teachers sought principals for professional and personal advice, and the more closely connected they were to their teachers, the more willing teachers were to invest in change and the creation of new knowledge and practices.

4.2.2 Distribution, access, and activation of organizational resources

These organizational resources do not directly determine teachers' practice. Instead, Spillane and colleagues explain, "For resources to affect an organization's output, they must be available *and* they have to be *recognized* and *used* by organizational members" (Spillane et al., 2009; p. 414). In other words, organizational resources must be *distributed*, *accessed*, and ultimately *activated* by teachers if they are to have any influence on practice. We apply this frame to understand how the organizational resources of human capital, social capital, and routines are distributed to teachers through school and district policies and then accessed and activated by teachers.

4.2.2.1 Distribution

Districts and schools can distribute these organizational resources through local policies related to coaching, PLCs, and instructional routines. For instance, a district might hire a math coach to support teachers in improving their math instruction. Districts or schools often specify the role that coaches are to play, and make hiring decisions that shape the resources that teachers may receive when interacting with the coach (Coburn & Russell, 2008; Penuel et al., 2009). For instance, will coaches specialize in a specific content area, or provide general instructional support? With regard to PLCs, districts or schools often support PLCs by designating time in teachers' work days for them to meet. Additionally, districts or schools may specify the purpose and intended function of PLCs, who is to participate, and what types of interaction they are to involve. Finally, districts or schools may employ formalized instructional routines between administrators and teachers in order to encourage reflection and improvement-oriented discussion related to instructional practice. For example, many districts and schools mandate cycles of observation and reflective feedback tied to annual evaluations.

District and school distribution of these organizational resources is an important macro-level feature that shapes the organizational resources that are available to teachers as they implement instructional policies such as college and career ready standards. However, a district or school's distribution of these resources to teachers does not guarantee that teachers will draw upon them (i.e. access) and ultimately use them (i.e. activation) to improve their instruction. For that, we look to micro-level teachers' interactions.

4.2.2.2 Understanding access and activation through teacher networks

We employ a network lens in order to understand how teachers access and activate these organizational resources through their interactions with others. Social network methodologies provide a way to systematically and precisely measure who teachers interact with and the resources that they may draw from these interactions. Networks theorists explain that resources are embedded in social structures, and can be accessed and activated for specific purposes (Lin, 1999). We examine teachers' "math networks", meaning their interactions about math instruction, in order to understand how they access and activate organizational resources in their collaborations with others.

Social network methodologies are an apt analytical tool for our conceptual frame of resource distribution, access, and activation. First, network surveys and interviews generally ask teachers to report the extent to which they engage with others, whether it be coaches, teachers via a PLC, or administrators via an instructional routine. These methodologies do not assume that just because these resources have been distributed by school and district policies that they will be recognized and accessed by teachers. Second, some network methodologies do not require that researchers set the bounds of organizations in advance, allowing for resources that teachers may access outside of school or district boundaries to emerge. Finally, network methodologies can

provide means for measuring the extent to which teachers activate resources they engage with in their networks by attending to the content of their interactions.

Access

Beyond having resources distributed through school and district policies, teachers must actively draw upon or *access* these resources through their interactions with others in their "math network". Social network methodologies have revealed valuable insights in studies exploring how teachers access the organizational resources of coaches, PLCs, and routines through their networks. For example, measuring the position of coaches in school networks has proven to have important implications for the extent to which teachers' access the expertise of coaches and, subsequently, their reform implementation (Atteberry & Bryk, 2010; Coburn et al., 2013; Coburn & Russell, 2008; Penuel et al., 2009). Additionally, network methods have revealed important implications for teachers attitudes, beliefs, and practices based on how they access teaching peers in their networks (Daly et al., 2010; Frank, Zhao, & Borman, 2004; Frank, Zhao, Penuel, Ellefson, & Porter, 2011; Horn, Chen, Garner, & Frank, 2017; Moolenaar, Sleegers, & Daly, 2012; Siciliano, 2016; Siciliano et al., 2017). Formal school structures such as grade level or content area teams influence who teachers access for advice and support (Spillane, Kim, & Frank, 2012), and these groups can influence teachers' beliefs about instructional reforms over time (Siciliano et al., 2017). Furthermore, network methods have shown that teachers' access to administrators and formal instructional leaders may help to foster trust, collective efficacy, and an innovative climate (Moolenaar, Daly, & Sleegers, 2010; Spillane & Kim, 2012).

Activation

We argue that the resources teachers access will be activated when they engage in substantive exchanges about teaching and learning. Instructional reforms call for teachers to make substantial shifts in their instruction that go beyond changing surface-level features (Cuban, 1993; Tyack & Tobin, 1994). In order to make these changes, teachers need professional learning opportunities. We join a growing number researchers in measuring the substance of what transpires in teachers' network interactions in order to understand the potential of teachers' interactions for generating professional learning opportunities (Baker-Doyle, 2015; Coburn et al., 2013; Coburn, Russell, Kaufman, & Stein, 2012; Coburn & Russell, 2008; Horn, Chen, Garner, & Frank, 2017; Penuel et al., 2009), drawing on the concept of depth. By "depth" we refer to the extent to which teacher interactions attend to instructional concepts, pedagogy, and student thinking in a specific and detailed way (Cynthia E Coburn et al., 2013, 2012; Cynthia E Coburn & Russell, 2008). Lower-depth interactions are those that focus on surface-level features of instruction (e.g. mapping out when different content will be taught) or non-instructional issues (e.g. school schedules, materials). High depth interactions will enable teachers to activate the organizational resources that they access through their collaborations with others in their networks. Network methodologies have allowed researchers to explore the link between the depth of teachers' interactions with those in their networks and educational outcomes of interest. Teachers who had strong ties with colleagues, access to others with relevant expertise, and engaged in higher depth interactions related to math instruction were better able to sustain reform-oriented math instruction over time (Coburn et al., 2012). Additionally, district developed instructional routines can help to foster high depth interactions amongst teachers and leaders

related to instructional reform (Cynthia E Coburn et al., 2013; Cynthia E Coburn & Russell, 2008).

Guided by our theoretical framework of exploring organizational resources as a key lever for teachers' policy implementation, we explore the following research questions:

1. How does the distribution of math coaching at the district or school level relate to teachers' access and activation of human capital?
2. How does the distribution of math professional learning communities at the district or school level relate to teachers' access and activation of social captial?
3. How does the distribution of math coaching at the district or school level relate to teachers' access and activation of human resources?

4.3 DATA SOURCES AND METHODS

4.3.1 Research context

Our study is situated in Tennessee, which had been one of the first states to adopt the Common Core State Standards (CCSS). The state has since transitioned to state-based Common Core-aligned standards, and a major policy focus of state education leaders has been pushing for improved instruction aligned with these more rigorous math standards. Leaders invested Race to the Top funds in statewide teacher professional development in math instruction, and have undertaken an initiative to train instructional coaches as a means of spreading standards-aligned instruction across the state. Our data comes from a larger study of the natural variation of 4th

through 8th grade teachers' math instruction and the sources of support they draw upon related to math instruction (Stein, Correnti, Moore, Russell, & Kelly, 2017).

This natural variation data presents a unique opportunity to explore how school and district crafting of local policies unfolds in the wild, without researcher or other targeted interventions. Tennessee state education leaders set the policy vision and priorities with the new math standards and related initiatives. However, it was up to districts and schools to determine how to distribute organizational resources through local policy strategies in order to meet the policy pressure of these new math standards. Our exploration allows us to understand the ways in which district and school policy strategies relate to teachers access and activation of these resources for math instructional reform.

4.3.2 Sample

Within the context of this broader study, our sample includes a smaller group of 40 teachers who participated in more intensive data collection in order to more deeply understand how they access and activate support related to math instruction. These teachers were recruited to participate on a voluntary basis, and are largely representative of the broader sample in terms of demographic characteristics. Our intensive sample includes teachers from 4th through 8th grade who come from 33 different schools in 25 districts and a variety of school locales, including rural, town, suburban, and city (see Table 6). As is the case with the broader teacher population in Tennessee, these teachers are primarily white and female.

Table 6. Demographic characteristics of teachers in sample (n=40)

	n	Percentage of sample
Female	37	92.5
Race		
White	36	92.3
Black	3	7.7
Asian	1	2.5
Hawaiian/Pacific Islander	1	2.5
School locale		
City	13	40.0
Suburban	6	14.3
Town	8	19.0
Rural	15	35.7
Only math teacher at grade level	19	45.2
Grade level		
4	9	22.5
5	12	30.0
6	8	20.0
7	6	15.0
8	5	12.5
Years of experience		
5 or less	11	28.2
6-12	10	25.6
13-19	8	20.5
20 or more	10	25.6

Note: Not all teachers reported years of experience, and teachers were allowed to select more than one race.

4.3.3 Data sources

4.3.3.1 Teacher math network interview

We conducted intensive interviews with each of the teachers in our sample. The purpose of these interviews was to gain insight into the organizational resources that teachers access and activate through their social networks related to math instruction. Adapted from Hogan and colleagues (2007) participant aided sociogram procedure, the interview protocol was specifically designed to produce more valid data about teachers' math networks and reduce the burden on teachers by making the process interactive and authentic. The interview prompted teachers to create a visual

representation of their network of who they interacted with about their math instruction (i.e. their "ties"). Teachers did this by writing the names of teachers on colored tabs of paper, with different colors distinguishing those who they seek for support and those who they interact with but do not seek for support related to their math instruction. They were prompted to arrange the colored tabs on a large piece of paper with concentric circles based upon how close they perceive each tie to be relative to themselves in the center. Finally, the interviewer prompted teachers to arrange the colored tabs to be either by themselves or in groups to represent how the teacher interacts with each person. Teachers were encouraged to write additional names on colored tabs of paper if they recalled ties that they had originally forgotten during any phase of this process.

During this process, the teachers were asked a series of questions to elicit more information about their relationship with the people in their networks, prioritizing those who the teacher perceived as the closest sources of support. The interviewer asked about their frequency of interaction, the typical context and nature of their interactions, and whether or not this interaction influences their instruction. In order to elicit specific responses about the nature of teacher interactions, the interviewers prompted teachers to describe a typical interaction and also about their last interaction with each tie. The interview protocol prompted teachers to select from a definitive set of options for these items in order to aid comparison, while also giving them flexibility to explain their selections. If the person was part of a group, the interviewer asked the teacher questions about the group including the purpose of the group as well as the content and nature of their typical interactions. After eliciting their entire network of interactions about mathematics, teachers are asked to reflect upon and name two individuals who have the most influence on their development as a mathematics teacher.

This interview protocol helps to elicit reliable and valid data in a number of ways. First, creating a visual of their interactions about math instruction helps teachers to have a concrete representation of what they are discussing. Visualizing their networks in this way can help teachers to recall people who they might have overlooked, and also helps teachers to be more thoughtful and holistic in their descriptions. Participants also reported finding the process enjoyable, making it more likely that they were invested giving accurate and complete information. Finally, the open-ended nature of the interview questions along with the interactive nature of the interview elicits richer information than is generally afforded in traditional social network surveys (Hogan, Carrasco, and Wellman, 2007).

4.3.3.2 Survey

We also drew from a survey that was administered to all teachers in the broader study and included general questions about teachers' support for math instruction, their instructional beliefs and style, and their school context. Specifically, we collected data related to how organizational resources related to coaching, PLCs, and instructional routines with administrators were distributed to teachers to support their math instruction. Teachers were asked to report whether or not each of these organizational resources were available to them, questions about the nature of the resource (e.g. Does your coach specialize in mathematics?). We also drew from questions asking about how frequently teachers engaged in instructional routines with administrators. Teachers had to participate in the practice more than yearly for it to be considered a routine by our definition.

4.3.3.3 Demographic data

We also compiled demographic data on teachers' school locale (e.g. city, suburban, town, or rural) from the publically available National Center for Education Statistics (NCES) Common Core of Data (CCD). The rules for distinguishing these locale categories are described on the NCES website.

4.3.4 Organizing data

First, we organized our interview data in two different formats to facilitate analysis: an Excel spreadsheet where we coded basic information about each tie in a teachers' network and a case template where we captured more qualitative information about the ties teachers seek out for support and the nature of their interactions.

4.3.4.1 Excel spreadsheet

We created the Excel spreadsheet to capture characteristics of each tie that a teacher named in their math network, using information from the interview. This included the name of the tie (first name and last initial to maintain confidentiality), their role (e.g. math teacher, other content area teacher, coach, administrator), and whether or not the teacher accessed this person for support or simply interacted with them. The spreadsheet allowed us to explore overarching patterns related to the characteristics of those who teachers accessed for support versus those who they simply interact with.

4.3.4.2 Case templates

On the case templates, we captured richer descriptive data about the teachers' school contexts as well as teachers' ties with those who they seek out for support, prioritizing those who they consider to be the closest sources of support. We noted whether or not each teacher had other math teaching colleagues who taught at the same grade level in their school, as this emerged as an important feature of school context. We organized the template by role group in order to more easily understand how teachers access and activate support from coaches, other teachers, school administrators, and others. The templates included paraphrased descriptions of the teachers' descriptions of why they accessed each tie, their relationship with each tie, and the typical nature of their interactions with each tie. The template also included a section to capture information about the tie(s) that teachers considered to be most influential to their development as math teachers, including teachers' rationale. These templates allowed us to condense valuable qualitative insights and facilitated our ability to search across teachers for emergent themes.

4.3.5 Analysis phases

In the following section we describe the phases of our analysis that correspond to our research questions, exploring the distribution, access, and activation of organizational resources to support math instruction. Table 7 provides a summary of how we operationalized measures of the distribution, access, and activation of organizational resources through coaching, PLCs, and instructional routines. In addition to these measures, we looked to the rich qualitative accounts from teachers' interviews to add insight and context for each research question. We did this by generating analytic questions from the patterns we found related to distribution, access, and

activation, and then systematically exploring the qualitative case templates to look for evidence and counter-evidence relating to our questions.

Table 7. Measuring distribution, access, and activation of organizational resources for math instruction

	Distribution	Access	Activation
Human Capital: Coaches	Survey • Does the teacher speak with a coach about math? • Does the coach specialize in math? • Is the coach in the school every day?	Interview • Does the teacher seek support related to math instruction from a general instructional coach? • Does the teacher seek support related to math instruction from a math coach?	Interview • Is a (coach/math teacher/school administrator) among most influential ties? • Does the teacher report a high depth interaction with the (coach/math teacher/school administrator)?
Social Capital: PLCs	Survey • Does the teacher have regular meetings with math teaching colleagues? Interview • Does the teacher have a grade level math colleague in the school?	Interview • Does the teacher seek support related to math instruction from a grade level math colleague in the school? • Does the teacher seek support related to math instruction from another math teacher (at a different grade level, or outside the school)?	
Routine Resources: Instructional Leadership Routines	Survey • Does the teacher engage in a routine involving discussing math teaching after being observed with a school administrator at least quarterly? • Does the teacher engage in a routine involving discussing math teaching after observing a colleague with a school administrator at least quarterly?	Interview • Does the teacher seek support from a school administrator related to math instruction?	

4.3.5.1 Phase 1: Distribution

We first analyzed our data to understand how these organizational resources were distributed to the teachers in our sample via coaching, PLCs, and instructional routines with administrators based on their survey responses. We drew from survey questions asking teachers about the availability of coaches, math teaching colleagues, and instructional routines with administrators (see Table 7). From teachers' responses to these questions, we created dichotomous variables to describe how these resources were distributed to teachers. Lastly, we compared the proportion of teachers with each resource available to the proportion of teachers in each locale (e.g. rural, town, suburban, city) to look for any evidence that school locale may have influenced resource distribution.

4.3.5.2 Phase 2: Access

In the next phase of analysis we sought to understand how teachers accessed resources available to them through their networks, drawing upon interview data organized in our Excel spreadsheet. Beyond having coaches, PLCs, and routines with administrators made available to them, we looked to see if teachers actually accessed these resources by seeking support from these role groups in their math networks (e.g. coaches, math teachers, and administrators respectively). Table 7 provides a summary of the specific information we captured from the interview to measure how teachers accessed resources in their networks.

4.3.5.3 Phase 3: Activation

We then created measures for whether or not there was evidence that teachers were activating each organizational resource that they access in their networks. We considered two major factors in determining whether or not teachers were likely to activate each resource based on their

interactions, looking at their interactions with coaches, other math teachers, and school administrators to understand their potential for activating human capital, social capital, and routines respectively. First, do teachers consider each resource to be influential? Second, did they engage in high depth interactions with these groups? We drew from the interview data and the case templates to create these measures of activation.

First, we coded the roles of the people that each teacher named as being the most influential to their math instruction. For each of the organizational resources, we created a dichotomous variable to reflect whether or not someone from the corresponding role group was named as most influential (e.g. coaches for human capital, math teachers for social capital, and administrators for routines).

If teachers did name someone from each respective role group as being among their most influential ties, we then looked to see whether or not they had high depth interactions with this person. We created measures of depth using the following process. We reviewed the qualitative case templates to explore the types of interactions that teachers reported engaging in with their most influential ties. We created emergent codes of the types of interactions teachers reported having with their most influential ties. We refined these emergent codes into 17 types of interaction (see Table 8) and coded each as either high or low depth, using a coding scheme modified from Coburn & Russell, 2008. According to this scheme, tasks or types of interactions were coded as high depth if they involved discussions of math concepts, instructional pedagogy, or student learning. Tasks or interactions were coded as low depth if they did not involve these discussions but instead focused on coordination and logistics for math teaching (e.g. sharing materials, pacing). We argue that influence as well as depth are important indicators for teachers to activate resources that may contribute to their professional learning, and therefore report the

extent to which teachers reported both influence and high depth regarding their interactions with coaches, other math teachers, and administrators.

Table 8. Types of interaction reported, by depth, from most common to least common

Low Depth
Share resources or materials
Share general instructional ideas (activities, tips)
Discuss pacing
Provide resources and/or answer questions related to state test
Provide or receive encouragement/emotional support
Receive general advice after sharing a lesson or being observed (e.g. tips for making stations run more smoothly)
Discuss cross grade level connections related to content coverage
"Bounce ideas off of" other person
High Depth
Discuss how to teach math concepts
Problem-solve instructional approaches for when students struggle
Plan lessons together
Answer or ask questions about math content
Discuss cross-grade level connections for mathematical ideas
Receive development related to math instruction
Reflect on how lessons went, how to improve them
Receive conceptual or pedagogical advice after sharing lesson or being observed (e.g. advice on questioning techniques to help guide student thinking)
Analyze completed student work or test performance

4.3.5.4 Phase 4: Relating Distribution, Access, and Activation

After creating these measures, we looked for patterns in how the distribution of coaches, math PLCs, and instructional routines with administrators related to teachers' access and activation of these resources. In order to help us detect patterns in the data, we created flow diagrams depicting distribution, access, and activation for each type of resource. These flow diagrams depict how teachers engaged with these resources by tracing how distribution shapes access and ultimately activation for the teachers in our sample (n=40). We also created tables to contrast

teachers' access and activation based on whether or not they had each resource available to them. From the flow charts and tables, we looked for evidence confirming our theorized relationship between these measures, as well as evidence that countered our theory. The flow diagrams and tables helped us to identify salient patterns. Last, we systematically looked at teacher case templates to gain deeper insight into the patterns that emerged in the flow diagrams and tables.

4.3.6 Reliability and validity

We took several steps to improve the reliability and validity of our coding and analysis processes. The teacher network interviews were lengthy and dense, so condensing this data into meaningful units was an essential step of analysis. We utilized a team of coders to conduct the first round of coding of these interviews, involving capturing basic information about the teachers' ties in the Excel spreadsheet. All coders were trained until they reached consensus, and the coding team met weekly for reliability checks. After capturing basic information about each teacher's network in the Excel spreadsheet, the authors met weekly to discuss emergent themes and interpretations related to teachers' interactions. Finally, the authors jointly adapted the depth coding scheme and conducted reliability checks to arrive at consensus about interpretations of the codes. After coding and organizing the data, we systematically searched for confirming as well as counter-evidence to strengthen our confidence in emergent themes.

4.4 FINDINGS

Our findings paint a more nuanced picture of how teachers engage with organizational resources to support their math instruction than we originally theorized. In the cases of math coaches and PLCs, the distribution of these resources was a powerful predictor of teachers' access and

activation of these resources. Still, the design of these resources was important as coaches' roles and the focus of PLCs shaped the extent to which teachers activated the human and social resources. A subset of teachers overcame a lack of social resource distribution by exerting their agency and forging important connections beyond their formal school communities. Finally, the distribution of instructional routines with administrators may have helped teachers to access administrators as sources of support but does not seem to generate high depth discussion related to math teaching and learning.

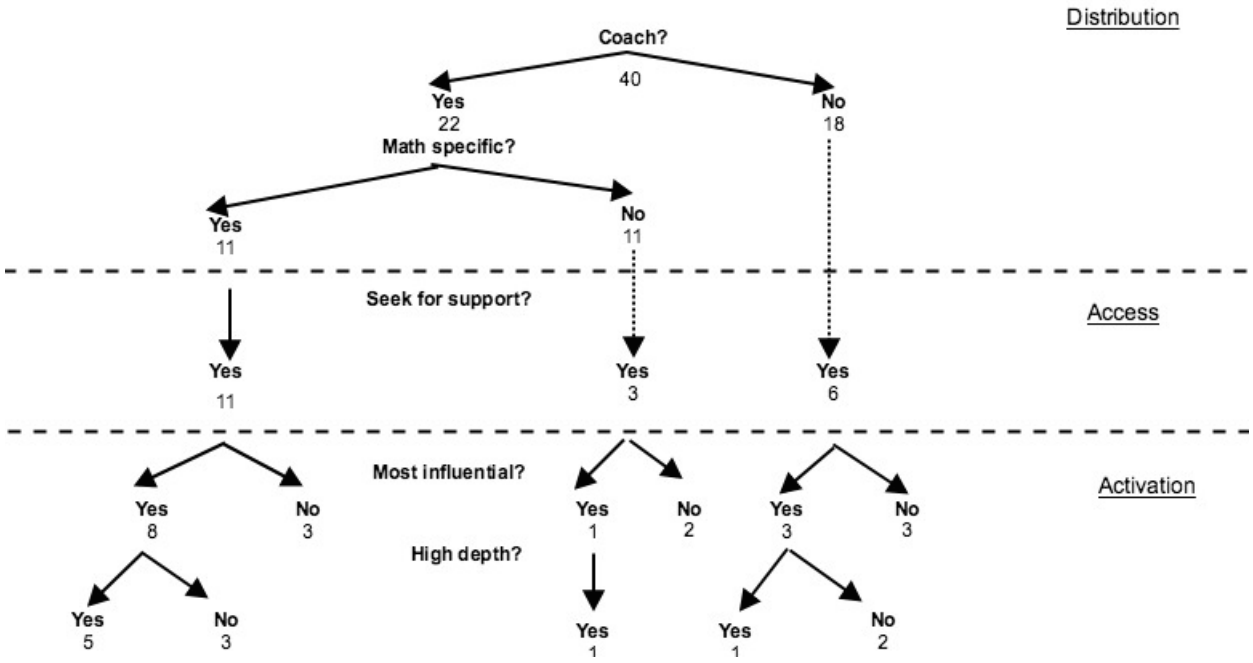

Figure 7. Distribution, access, and activation of human capital through coaching

Table 9. Comparing access and activation between teachers with and without math coaches

Distribution	Math coach (n = 11)	No math coach (n = 29)
Access	11 (100%)	9 (31%)
Activation- influence	8 (73%)	4 (14%)
Activation- depth	5 (45%)	2 (7%)

4.4.1 Human capital distributed, accessed, and activated through coaching

4.4.1.1 Math specific coaches

While fifty five percent of teachers in our sample (n=22) reported having a coach available, only half of those teachers had a coach who specialized in math. Having a coach available who specialized in math was an important factor in shaping whether or not teachers would access and ultimately activate a coach's expertise (see Figure 7). First, teachers were more likely to access math coaches through their personal math networks than they were general coaches. All teachers with math specific coaches available (n=11) accessed the coach in their networks, while only 3 out of 11 teachers with general coaches but no math specific coach available accessed the coach in their network. In addition to being more likely to access math specific coaches, teachers were also more likely to consider math specific coaches to be most influential (8 out of 11 teachers) compared to those with only general coaches (1 out of 11 teachers). Specifically, teachers described finding value in having a coach who had expertise in math content, standards, and pedagogy. Teacher 791 described how the math coach was a valuable source of support in helping them to transition to the new math standards:

> …Without her, I don't think I would have survived the transition of it. I don't think I'd know where to start. I wouldn't have anybody to go to, wouldn't have a clue. As far as even just the content, the new standards and everything. I just- I'd be lost. I would.

Teachers with math specific coaches were more likely to activate their expertise than general coaches (5 out of 11 teachers with math coaches versus 1out of 11 teachers with general coaches). Recognizing math coaches' specific expertise related to content and pedagogy seemed to help teachers activate their resources through high depth interactions. Teacher 791 went on to describe the coach's math pedagogical expertise and how coaching helped to refine the teacher's questioning techniques and push student thinking:

> My issue or struggle that I have is allowing the students to struggle when they come to a problem. So, we were doing a different skill, or doing a new skill, and she saw that I was getting ready to save the child (help the child get the answer). She coached me on what type of questions (to use) to pull out the information. She said, 'Okay, let's ask this,' or just coached me on how to ask some questions to get him to answer the questions instead of me giving him the answer.

Coaching interpreted, enacted differently

Additionally, patterns of the distribution, access, and activation suggest that the role of coach can be broadly enacted and interpreted differently across different contexts and teachers. Interestingly, some teachers who did not have math specific coaches available to them still managed to access someone who could act as a math coach through their personal networks (9 out of 29). For some teachers, they accessed someone as a math coach who they perceived as having relevant math expertise. In these cases, their perceived expertise of the other acting as a "math coach" related to their activation of resources through high depth interaction. Teacher 141 accessed another math teacher in the school who taught at a different grade level but served as a "teacher leader". Teacher 141 explained that the teacher leader had received formal training in the school's new math curriculum and was charged with supporting all math teachers in the

curriculum. In addition to having expertise with the new math curriculum, Teacher 141 valued this teacher leader's advice on math pedagogy and accesses her expertise regularly, which contributes to the teachers' learning new instructional techniques:

> She is kind of our go-to for everything and I do have some sort of contact with her daily… I go observe her a lot and I can because we don't have the same planning time. So when I get a few minutes, I go and observe her because I- she really has ideas. She has great ideas. I mean, even some of the slightest things like grouping and how she has kids respond to questions. She has really good ideas.

Teacher 53 had to look beyond the school organizational boundaries but found valuable expertise in her former mentor teacher who taught and served as a math coach in a different school. Teacher 53 described her reasons for seeking her mentor, "I really trust her expertise and she has a very good grace about making you feel very confident even if you are understanding something way more slowly than what she has." Teacher 53 and her former mentor set up formal lunch meetings every other Saturday. Even though they taught different grade levels, the teachers regularly discussed connections between math concepts that they would be teaching, with a focus toward how they could strengthen student conceptual understanding. Teacher 53 described a recent high-depth interaction around how to introduce the math concept of exponents:

> So if I am teaching exponents, she's got exponents, but now those exponents have negative numbers in seventh grade honors math. So we look at, what connections do they need to have? What resources do I have that would be helpful for her? And some different ways we go about instructing it. What vocabulary the kids are going to need. What words we are saying because there are like three or four ways they can read that exponent and if you can't say it, it's really hard to articulate how to do it. So just figuring

this is one way that she'll say it. How do I say it? Have the kids heard it before? So we can just acknowledge all of those ways and say, yeah, we are saying the same thing.

Other teachers reported accessing someone as a math coach due to their formal role in the school as a math interventionist or Response to Intervention (RTI) leader. Teachers who accessed coaches based on their formal role but not their perception of the others' expertise did not end up finding the coach influential or activating their expertise through high depth interactions. Teacher 135 explained that the role of math coach in the school had been replaced by an "RTI coach". The teacher only described low depth interactions with this person:

> We used to have a math coach, but the person we have now, I don't- I think she kind of qualifies for both math and language. She's more the RTI person that taught us about the progress monitoring website and how to do that and how to look at the data…

In another school, Teacher 24 described accessing the "PLC coach" as a proxy for a math coach, but their interactions were limited to data review and did not delve into instructional issues:

> It's sort of like – she's like our data person (the PLC coach), so she doesn't really give us advice on how to teach it, just this is what you are low in, this is – this is what your kid scores low in. And then we have to come up with ways that we're going to fix that. So she's sort of like a facilitator of discussions, but she doesn't ever give us any input on how to teach it… But yeah, she's a PLC coach, so that's not really- we don't talk about teaching. I mean, I hate to say it like that. She's our data person. So I don't know if she knows how to teach math or not.

Overall, the roles of those accessed as "math coaches" through teachers' personal networks varied greatly. The biggest factor in determining whether teachers would activate the

expertise of coaches was their perception of the coach's math-specific expertise. Despite being perceived as having the role closest to that of a "math coach", teachers with an "RTI coach" or "PLC coach" tended to describe low depth interactions emphasizing coordination and logistics more so than math content and pedagogy.

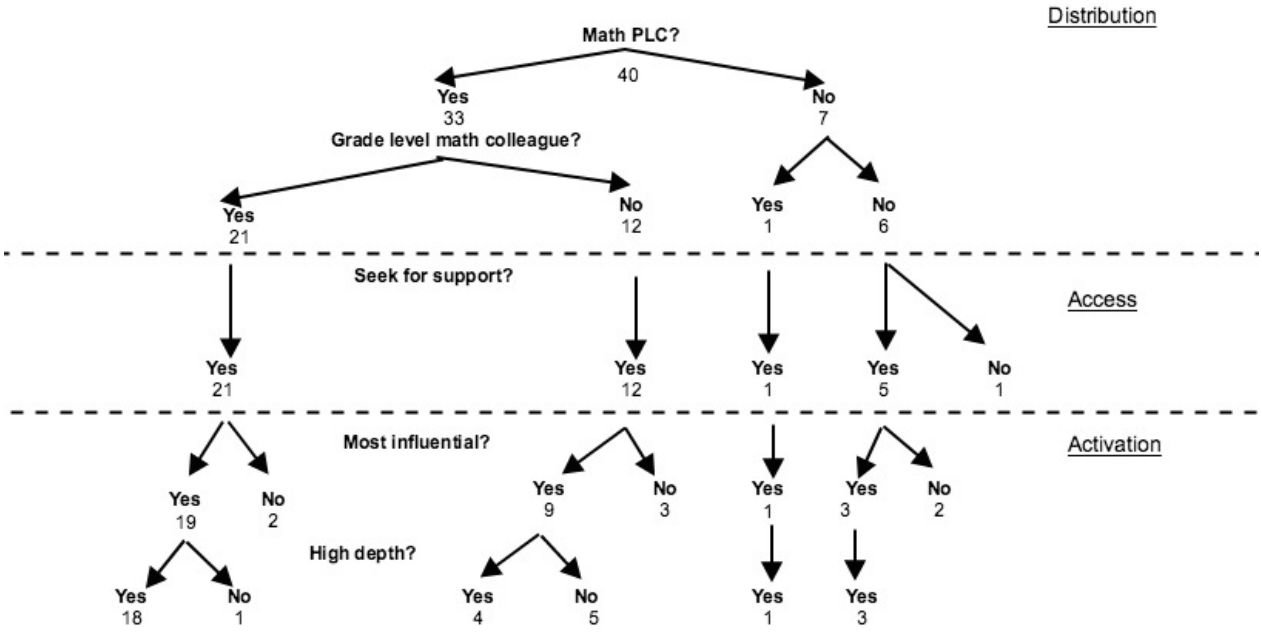

Figure 8. Distribution, access, and activation of social capital through PLCs

Table 10. Comparing access and activation between teachers with and without math PLCs

Distribution	Math PLC (n = 33)	No math PLC (n = 7)
Access	33 (100%)	6 (86%)
Activation- influence	28 (85%)	4 (57%)
Activation- depth	22 (67%)	4 (57%)

Table 11. Comparing access and activation between teachers with and without grade level math colleagues

Distribution	Grade level math colleague (n = 22)	No grade level math colleague (n = 18)
Access	22 (100%)	17 (94%)

Table 11 continued

Activation- influence	20 (91%)	12 (67%)
Activation- depth	19 (86%)	7 (39%)

4.4.2 Social capital through PLCs

Having math PLCs (i.e. regular meetings about math with other math teachers) and having another math colleague in the school at the same grade level were powerful predictors for whether or not a teacher accessed and activated social capital through their interactions with colleagues. Eighty-three percent of teachers (n=33) had math PLCs available through their schools or districts (Table 10), while fifty-five percent of teachers (n=22) had access to a grade level math teaching colleague in their schools (Table 11). Whether or not teachers had PLCs available to them largely overlapped with the availability of a grade level math teaching colleague. Ninety five percent of teachers with grade level math teaching colleagues in their schools (21 out of 22) reported having math PLCs, while only two-thirds of teachers without grade level math colleagues had math PLCs (12 out of 18). We also found evidence suggesting that schools in rural areas and towns may be slightly less likely to have math PLCs. While teachers in rural and town schools comprised fifty five percent of our sample, they represented three quarters of the teachers with no math PLCs.

4.4.2.1 Power of grade level math colleagues

While the overlap between having grade level math colleagues and math PLCs made it challenging to disentangle their influence, it seems that having at least one grade level math colleague made teachers more likely to access and activate their resources (see Table 11). Teachers attributed great value and ultimately, influence, to interactions with those who taught the same grade level and subject. For many, teaching the same thing and interacting frequently

forged a close bond between teachers. One teacher explained of her grade level math teaching partner, “I’m the right hand and she’s the left,” while another compared her relationship with two grade level teaching colleagues to the “three musketeers”. Another joked that he sees his grade level math colleague more than his spouse.

Teachers who had another grade level math colleague almost always considered this person to be amongst their most influential sources of support (Table 11). When we examined the types of interactions that teachers reported having with grade level math colleagues who they consider to be among their most influential sources of support, teachers seemed to value both high and low depth interactions that would facilitate their day-to-day lesson planning and execution. For instance, the most common types of interaction that teachers reported with their grade level math colleagues included planning lessons together, discussing how to teach specific math content, and sharing resources and materials. While sharing resources and materials is considered to be low depth, having this level of familiarity with the same content and confidence in one another’s teaching was important to teachers and helped to make planning and preparation more efficient. Teacher 53 explains:

> We trust one another to be able to develop resources. If (grade level math colleague) sends me something that we’ve talked about, I know it’s going to be good. I don’t have to worry about going back, double checking. So she’s very competent.

In addition, teachers seemed to value the influence of grade level teaching colleagues as they were naturally more fluent in the specific standards and curriculum that they had to teach. Having this level of familiarity seemed to lend to higher depth discussions about specific math concepts and problem-solving instructional approaches for when students do not understand the material. Teacher 121 described how conversations with his grade level math colleague boosted

his confidence in his teaching, explaining, "…when I'm able to talk with her and analyze the math, my lessons go much better- whereas, if I was to do it on my own, I would be unsure and not confident."

4.4.2.2 PLCs may provide access to resources for teachers without grade level colleagues.

PLCs may provide opportunities for collaboration for teachers who don't have access to grade level math colleagues in their school. One third of teachers with no grade level math colleagues were still able to access and activate the resources of others through PLCs. Teachers described formal opportunities organized by their district or county to bring together math teachers at the same grade level for collaboration. Teacher 229 explained how such a group began in her district:

> One thing they did, the district did was one day end of October, actually, they got all the middle school math teachers subs and we got to meet all day long about what we were teaching, what needed to be taught, how we went about teaching it. That was probably one of the most beneficial days, we had all year long. It was great. Can we do this again, please?... We asked for it… I said, 'Is there any way we can do this?' And sure enough a few weeks later, they said, 'Okay. Here we go. Here's your day.'

As Teacher 229 explained, these opportunities were especially valuable to teachers who were otherwise the only math teacher at their grade level in their school. They presented an opportunity to discuss specific grade level math content. Teacher 224 described the value of his district-level PLC:

> I think this group also is very important because they're doing the same thing you're doing, let's face it. They're teachers teaching a fifth grade classroom and it's not going to be a surprise. If a child has a misconception in my classroom- (School) is very similar in

dynamics and culture with (School). So there's going to be similar problems that occur there, that occur here. And so it's just really good for us to have a discussion about the math and what they see.

4.4.2.3 Focus of PLC determines activation

While PLCs provide an opportunity for teachers to access the resources of others, they do not guarantee activation. Teachers' accounts of how they access and activate the expertise of other math teachers suggest that the focus of PLCs shapes whether or not they will lead to activation. Some teachers' comments suggest that math PLC time is poorly executed, and therefore not very influential and unlikely to be activated. One teacher admitted that the PLC was usually just "time to gossip" and another lamented that PLC was only a "buzzword". Another described that the time felt redundant with other times for collaboration involving the same group, explaining that teachers feel as if they do not have anything new to say to one another during formal weekly PLCs as they plan informally throughout the week.

Other teachers' accounts suggest that math PLCs that emphasize coordination and logistics are unlikely to lead to activation. Teacher 113 explains that his PLC of other grade level math teachers uses their time to divide responsibilities related to grading common tasks, inputting those scores into the computer, and creating questions for the next unit test. While this time helped to make teachers' work more efficient, Teacher 113 did not consider the group to be influential to his instruction and therefore did not activate resources from these PLCs. Other teachers with low depth interactions in their PLCs describe a focus on test preparation and RTI during math PLC time. While both areas of focus could be conducive to higher depth discussions, teachers' descriptions suggest that they often feel more compulsory and surface-level. Teacher 10 explains how she does not get valuable support from other colleagues during

the PLC, which is used for test preparation. Rather than support one another instructionally, it feels as if they time is merely used to "relay information" about the state test. Teacher 24 explained that PLC conversations were limited to analyzing data in a way that felt removed from discussions of math concepts and instruction: "…When we're in those PLC meetings, we're usually analyzing data and so we're not really talking about – well, we are talking about teaching, but from a very not teaching standpoint."

4.4.2.4 Teacher agency in forging informal PLCs

Interestingly, three of the six teachers without formal math PLCs or grade level math colleagues in their schools still managed to access and activate the resources of other math teachers. These teachers each described exerting agency to forge their own informal communities involving teachers from other schools. Teachers described the value in connecting with others who were dealing with the same challenges and issues as they were. A sense of shared challenges seemed to help teachers access one another and consider one another as influential sources of support. Teacher 108 described:

> Everybody in this circle here (pointing to interview sociogram showing informal PLC), most of us here, like we've been very close and when Common Core first started, you know, and we'd struggle with things, you know, meet and kind of see and where each other's at and what you're struggling with, so this is like a huge support system right there for me.

These informal communities provided teachers with opportunities for more high depth discussion around specific grade level topics that were otherwise unavailable to teachers in their schools. Teacher 210 explained how meeting with other grade level teachers provided valuable

resources for teachers to engage in high depth lesson planning and sharing specific ideas related to grade level math content that were otherwise unavailable:

> It's helped me a lot to talk through the planning of my lessons since I don't have a fifth grade math teacher here. When we do get together and we go through several weeks of lessons in one sitting, it's really nice to talk about it and says, 'What would you do with this question? This is kind of what I would do.' Then we kind of build off of each other's ideas.

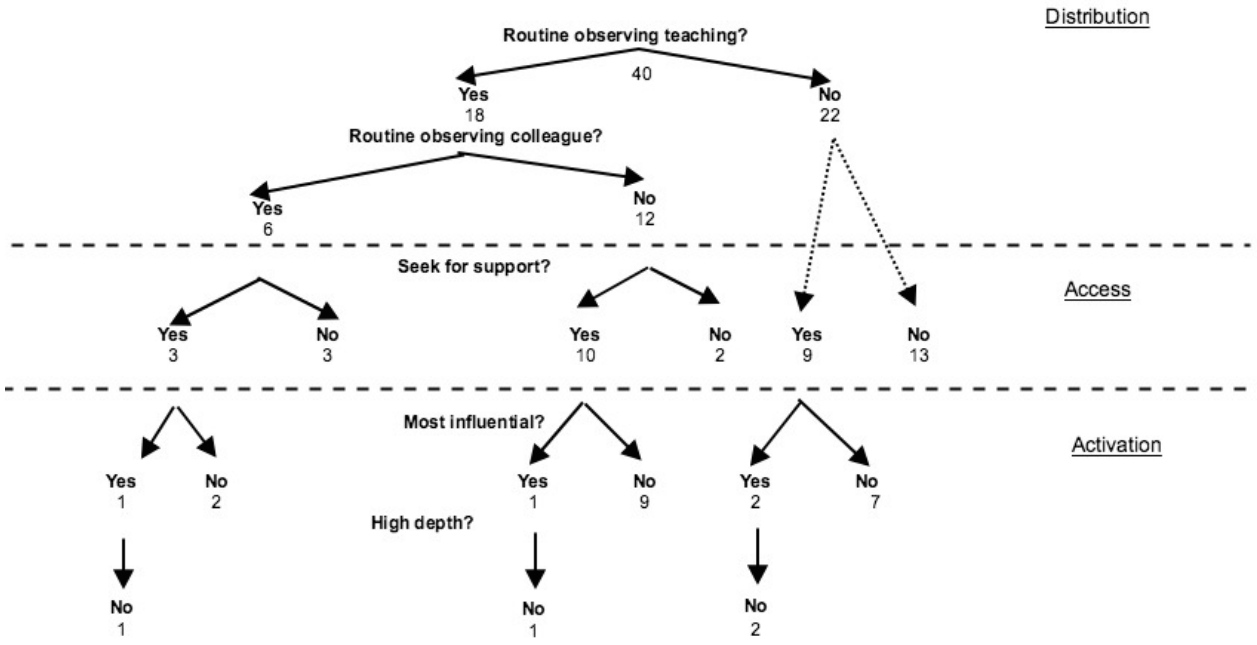

Figure 9. Distribution, access, and activation of resources through instructional routines

Table 12. Comparing access and activation of resources between teachers with and without instructional routines with administrators

Distribution	Instructional routine (n = 18)	No routine (n = 22)
Access	13 (72%)	9 (41%)
Activation- influence	2 (11%)	2 (9%)
Activation- depth	0	0

4.4.3 Instructional routines with administrators

Finally, we examined the extent to which participating in instructional routines with administrators may influence teachers' access and activation of resources from their interactions with administrators related to math instruction. Slightly less than half of teachers participated in a routine (defined as happening at least quarterly) with administrators involving being observed and then reflecting upon their instruction. Only fifteen percent of teachers also participated in a routine with administrators involving observing a colleague's math instruction and then debriefing (see Figure 9). Participating in these routines may have helped teachers to see administrators as potential sources of support and subsequently access them in their personal math networks. For instance, almost three quarters of teachers who participated in at least one routine with an administrator accessed an administrator in their math networks, compared to only about forty percent of teachers with no routines with administrators (see Table 12).

At the same time, teachers' descriptions of how they accessed administrators in their personal math networks provide little evidence that they viewed administrators as valuable sources of math instructional support. Instead, participating in routines may simply have helped teachers to see administrators as sources of general support or encouragement. Many described seeking general advice from administrators, leading to lower depth interactions and not activating resources to improve their professional practice. For instance, Teacher 108 saw the principal as a valuable connection to district expectations and sought logistical support related to implementing district tasks:

> Sometimes I'll go and I might ask her, you know, like when they said they wanted us to do a task like per month, I asked what her expectations of that were, do you want us to do it like weekly, you know, how many tasks, can we just do it when it fits into the lesson or

do you want us to have a certain time. So I guess things that come down from the district, I ask her for advice on that…

Even amongst the four teachers who considered an administrator to be amongst their most influential sources of support for their math instruction, their interactions tended to be general and not math specific. Teacher 193 saw the principal as a mentor, and described receiving general advice on how to use best practices after being observed. Teacher 121 viewed the principal as an important source of encouragement, helping her to navigate interpersonal issues relating to Teacher 121's role as a school math leader. Teacher 113 sought support related to student behavior from the assistant principal, and felt that he was a valuable connection to resources related to preparing for the county test.

Despite almost half of the teachers reporting participating in an instructional routine with an administrator, teachers almost never described these routines when asked about their interactions related to math with administrators. This suggests that these routines may have been thought of by the teachers as compulsory but not truly influential or memorable sources of support related to math instruction.

4.5 SUMMARY

What do these cases tell us about teachers' potential activating human, social, and routine resources from their interactions with others and enhancing their professional learning? First, we found little evidence that instructional routines contributed to teachers activating resources related to math instruction. Second, teachers tended to access and activate the resources of grade level math colleagues and coaches who specialize in math to a greater extent than other

colleagues and general coaches. Third, the design of coaches' roles and math PLCs matters for teachers' activation of these resources. Finally, some teachers exerted agency and forged their own math coaching supports and/or math PLCs, despite not having these resources formally available through their schools. All together, our findings underscore that resource distribution, access, and activation are all distinct, but related, phenomena and have important implications for teachers' potential for professional learning through their collaborations with others.

4.6 DISCUSSION

Schools and districts allocate different supports for teacher collaboration, as part of efforts to diffuse new ideas about teaching and learning and ultimately improve teachers' instruction. When we explore the impact of these resources, the extent to which they are distributed to teachers tells only part of the story. Whether or not teachers access and ultimately activate resources through their collaborations depends upon the design and implementation of coaching, PLCs, and instructional routines. While having these supports provided additional opportunities for teachers to collaborate, they did not guarantee that teachers would engage in high depth discussion around teaching and learning. At the same time, some teachers without these supports forged valuable connections across organizational boundaries that allowed them to engage in such discussion.

4.6.1 Practical implications

4.6.1.1 Design of collaborative opportunities matters for activation

Social capital theorists (e.g. Adler & Kwon, 2002; Lin, 1999) as well as researchers studying teacher communities (McLaughlin & Talbert, 2001) have long contended that teacher interaction and access to resources is not inherently productive; the substance of teachers' interactions matters has different implications for their learning and instructional change. Researchers have studied how more substantive, high-depth interaction may contribute to teacher learning and ability to improve and sustain practice (Horn, Chen, et al., 2017; Horn, Garner, et al., 2017; Horn & Kane, 2015) and some have begun to explore the types of settings that are more conducive to high depth interaction (Coburn et al., 2013; Coburn & Russell, 2008; Penuel et al., 2009).

We add to this line of research, applying the lens of "resource activation" and exploring how different configurations of resource distribution and access link to activation. As others have found, simply providing opportunities for collaboration with colleagues and coaches is insufficient for generating high depth interactions. The design and implementation of coaching roles, PLCs, and teacher routines shape the depth of their interactions (Coburn & Russell, 2008; Penuel et al., 2009). Coaches who did not specialize in mathematical content and student learning or whose primary role does not involve attending to these areas are unlikely to engage in substantive collaboration with teachers and influence their instruction. PLCs must provide regular opportunities for teachers to reflect upon their pedagogy, student learning, and their approach to teaching math concepts. Intentionally designed routines of interaction can help to focus teacher collaboration around these issues. Without routines, collaborations may shift to focusing on coordinating logistical aspects of teaching like pacing and finding materials or may attend to these issues in a way that is merely compulsory.

4.6.1.2 Power of teaching colleagues

Another overarching theme from our findings is the power of teaching colleagues for influencing instruction. Previous research suggests that strong peer groups provide a mechanism for teachers to grapple with and test out new ideas related to their practice (Frank et al., 2011), a source of trust that makes teachers feel comfortable experimenting (Moolenaar et al., 2011), social pressure to change practice (Frank et al., 2004), and can influence teacher values and opinions about reforms (Siciliano et al., 2017). It is no surprise then, that teachers most often feel a strong influence on their teaching from other colleagues.

Our findings suggest that teachers draw valuable influence from those who can most relate to their day-to-day instruction. This bears implications for school efforts to spread desired change in teachers' practice. Spillane and Kim (2012) found that teachers with formal leadership positions who maintained part-time work inside the classroom were more likely to be sought for advice and have close ties with other teachers than formal leaders with no classroom responsibilities. If districts are allocating human capital to support teacher learning and instructional improvement, it may be beneficial to invest in developing teacher leaders to spread desired instructional change rather than creating positions that fully remove teachers from the classroom.

4.6.1.3 Teacher agency in creating networks

While teachers' networks and collaborations are shaped by formal organizational structures and boundaries (e.g. Spillane, Kim, and Frank, 2012), they are not bound by these and the resources they offer. Teachers can exert agency in forging connections outside of traditional organizational structures and boundaries, and in doing so may activate valuable resources (Anderson, 2010). Our findings show how some teachers were able to forge informal communities and ties with

those outside of their school and grade level organizational boundaries, which allowed them to overcome a lack of resource distribution and activate resources for their professional learning.

This suggests practical implications, particularly for small or rural schools in which teachers rarely have another colleague who teaches the same content at their grade level. It may be helpful for such districts to explore strategies for helping teachers to forge their own communities of support as well as recognize and leverage the relevant expertise of others. The teachers in our sample who were successful in creating these boundary-crossing support networks were able to identify substantive commonalities with teachers outside their formal boundaries, while others without outside connections tended to call out such boundaries as a reason for not collaborating. Research suggests that educational leaders may be able to successfully intervene in helping teachers to become aware of the relevant expertise of others and ultimately draw upon that expertise (Baker-Doyle & Yoon, 2011; Wilhelm, Chen, Smith, & Frank, 2016). School and district leaders should consider crafting opportunities for that could help surface the relevant expertise of others outside of school organizational boundaries and make this expertise visible to teachers. This could happen through district or county-level events, or even through online platforms for collaboration.

4.6.2 Research implications

Our findings offer several methodological implications for future research examining teachers'collaborations for educational improvement. There is a rich tradition of research exploring the relationship between teachers' networks and their instructional practice (Coburn et al., 2012; K. A. Frank et al., 2017, 2004; Frank et al., 2011; Goddard, Goddard, & Tschannen-Moran, 2007; Leana & Pil, 2006; Moolenaar et al., 2012; William R. Penuel, Sun, Frank, &

Gallagher, 2012; Pil & Leana, 2009; Siciliano, 2017). Many of these studies have utilized surveys to map teachers' structural access to resources, either as a result of their broader network properties (e.g. density, closure, etc.) or their personal position in the network structure (e.g. centrality, tie span). Connecting these network properties to measures of teacher practice and educational outcomes has yielded valuable evidence about the link between strong networks and positive educational outcomes (e.g. Goddard, Goddard, & Tschannen-Moran, 2007; Leana & Pil, 2006; Moolenaar, Sleegers, & Daly, 2012; Pil & Leana, 2009; Siciliano, 2017), and has allowed researchers to engage in more large-scale data collection and analysis.

At the same time, the extent to which teachers actually activate the resources that they access in their networks is often overlooked. We call attention to the distinction between teachers having access to resources through their ties with others and actually activating those resources. Our findings reveal that teachers do not consider each of their ties to be influential to their math instruction. By asking teachers whether or not they sought support from each tie and to reflect upon the ties that most influenced their instruction, we gained deeper insight into the factors that influence teacher development and instruction. While we asked teachers these questions in an interview format, similar measures could be added to network surveys and help to narrow in on pockets of influence and perhaps even the mechanisms through which teachers draw influence from their interactions.

Additionally, our findings underscore those of other network researchers who describe the benefits of using methods that do not assume the boundaries of teacher networks in advance and allow teachers to name ties outside of formal organizational boundaries (e.g. Anderson, 2010). As we found, omitting these ties would have made some teachers appear to be under-

supported in their school contexts when in fact they had rich networks of support that spanned boundaries.

4.6.3 Limitations and future directions

In all, our findings suggest a tentative relationship between the ways in which the distribution of resources to support teachers' math collaboration relates to their access and activation of reources to support their professional learning. While our operationalization of resource activation as influence and depth provides a novel lens for unpacking the nature of teachers' interactions, our approach had several limitations that could be built upon in future research. We drew upon teachers' descriptions of their typical interactions with others during the interview in order to rate the depth of their interactions. Our approach of coding the depth of teachers' reported interactions with their most influential ties provided a targeted and efficient means for assessing depth, but is subject to teachers' own bias and recollection errors. Future studies could further explore the concept of teachers' resource activation through collaboration with other methods. Researchers have identified that depth of interaction is an important factor in shaping teachers' potential for learning and improving (Cynthia E Coburn & Russell, 2008; Cynthia E Coburn et al., 2012; Horn, Garner, et al., 2017; Horn & Kane, 2015), yet there are limited examples of methods for measuring depth of interaction. Observations of teachers' collaborations may be the most thorough option, but are time consuming and limit the number of participants that researchers can study. Exploring other methods for assessing depth of interaction including logs of interactions or surveys and examining the reliability and validity of these methods would be an asset to the field.

4.6.4 Closing

Teachers can draw valuable learning opportunities from their collaboration with others, but the context and design of their collaborative supports matters. For districts and schools, allocating support for teachers' collaboration through instructional coaches, PLCs, and instructional routines may be insufficient for supporting teachers' professional learning and instructional improvement. Instead, supports for collaboration should be intentionally crafted to focus teacher interaction on issues of math content and student learning.

5.0 DISCUSSION

The purpose of this dissertation was to contribute to gaps in the literature by exploring the embeddedness of teachers' collaborations for policy implementation in broader educational systems. It is hard to imagine how ambitious educational reform efforts could be successful without teacher collaboration. For schools striving to include SWD, general and special educator collaboration can help to ensure that students can access challenging curriculum and experience acceptance and belonging amongst their peers. With regard to math instruction, collaborations with coaches, colleagues, or administrators can help teachers to enhance their content expertise, work out new ideas for their practice, and attain valuable instructional guidance. At the same time, the organizational complexity of schools and the multiple and competing pressures they face can make productive collaboration challenging. This is particularly true in high schools, where teacher autonomy and grade level/departmental divisions tend to structure and compartmentalize opportunities for interaction (Dieker & Murawski, 2003; McLaughlin & Talbert, 2001; Schumaker & Deshler, 1988; Thousand, Rosenberg, Bishop, & Villa, 1997).

In this section, I connect again to the three overarching conceptual threads uniting these studies that were presented in the introduction, highlighting the insights that each afforded. Next, I describe practical implications of the findings. Finally, I close with implications for future research.

5.1 OVERARCHING CONCEPTUAL THREADS

5.1.1 Organizational structure as resources

Each of my studies explored the organizational structure of schools and districts by attending to resources that are important for shaping teacher collaboration and by examining how they are distributed to do so. Organizational theorists have long elevated the importance of attending to school organizational structure for understanding how schools respond to policies and institutional pressures (e.g. Rowan, 1982; Weick, 1976). Examining organizational structure in terms of how resources are deployed and distributed provides a specific frame that can aid in comparison across studies. Resources including human capital, social capital, and organizational routines are especially salient for shaping teacher collaboration. When applied to study districts and schools, my studies examining school organizational structure in terms of the resources that are deployed for teacher collaboration provided insight into organizational priorities and the host of pressures that schools face.

For instance, Paper 1 revealed that pressure for students with disabilities to pass their general education classes was a strong and driving factor of school organizational routines. Paper 2 found that norms of teacher autonomy and pressure to perform on high stakes tests were prominent in shaping how resources were distributed to support special education. In both cases, the resulting distribution of resources detracted from teachers' abilities to productively collaborate to plan for specialized instruction for SWD. These cases highlight the extent to which multiple other pressures and policies come together to structure school resources in ways that may detract from teachers' ability to collaborate in ways that might improve instruction, and in turn, student learning opportunities. Overall, my research contributes to a body of research

exploring how schools navigate multiple and sometimes seemingly conflicted policy goals (Honig & Hatch, 2004; Russell & Bray, 2013). Findings from my studies add that the implications of schools navigating multiple policy pressures plays out in school organization of resources, which may facilitate teachers' work toward certain policies while hindering their work toward others.

5.1.2 Practice as interaction

My studies also offer insight into the interactive nature of teachers' practice for policy implementation. In particular, Papers 1 and 3 explored teachers' organizational routines as a way to provide insight into their practice. In both policy contexts, including SWD and ambitious math instruction, it is important for teachers to change their practice not only in terms of what goes on inside their individual classrooms but also in terms of how they interact with others. In the face of these policy demands, interactions with others offer valuable resources for teachers' practice.

These studies add nuance to the field's understanding of how organizational routines can be employed in education settings. First, my studies show how routines can emerge (Paper 1) or be intentionally designed (Paper 3) in response to policy pressures. Other studies of organizational routines have demonstrated how they can be used to spread desired instructional changes aligned with instructional reforms (Coburn et al., 2013; Coburn & Russell, 2008; Spillane, Parise, & Sherer, 2011b). Intentionally designed routines can focus teacher collaboration on substantive issues of teaching and learning related to instructional reforms (Coburn et al., 2013; Coburn & Russell, 2008). At the same time, Paper 3 suggests that the roles of those who participate in routines and their expertise are important for shaping their influence. Specifically, teachers rarely viewed administrators as content or instructional experts.

Instructional routines provided opportunities for teachers to connect with administrators, but did not shape the resources that teachers drew upon for instructional support. While organizational routines was not the primary focus of Paper 3, this suggests that the design of organizational routines and the expertise of those involved matter for whether or not they will influence teachers' practice.

Paper 1 provides a more in-depth explanation of teachers' practice as constituted in emergent organizational routines. Few, if any studies have examined emergent organizational routines to understand how teachers respond to policy pressures. Emergent organizational routines provide a valuable lens into teachers practice that is collaborative in nature and stretched across different times and places. This may be an increasingly valuable perspective for exploring teachers' practice in the face of modern policy demands. Teachers are faced with more rigorous standards of learning, and learners with diverse backgrounds and needs, and schools commonly employ collaborative approaches to help teachers meet these demands. Paper 1 shows how exploring teachers' practice in terms of emergent organizational routines provides deeper insight than a more narrow lens on teachers' instructional practice. As Paper 1 demonstrates, teachers' collaborative routines shape what goes on inside of classrooms and specifically the extent to which teachers can be prepared to deliver individualized instruction to SWD. Taken together, my studies suggest that organizational routines can be an important context for understanding the extent to which/how teachers' practice may be influenced by collaboration.

5.1.3 Connecting the macro and micro

Lastly, these studies all provide insight into the link between macro-level forces like local policies and school organizational structures and the micro-level dynamics of teacher

collaboration. Connecting these macro and micro forces allows my work to contribute to a body of research examining how local policies may or may not change practice through school design (e.g. Coburn & Russell, 2008; Coburn et al., 2013; Hopkins & Spillane, 2015; Spillane, Shirrell, & Hopkins, 2016). Research has illustrated how school organizational routines can help to align teachers' practice with instructional policies; more tightly coupling policy and practice (Spillane et al., 2011; 2016).

Attending to the link between macro-level policies and micro-level collaboration in my studies revealed examples of how school organization can both couple and de-couple policy and instruction. Papers 1 and 2 demonstrated how school organization for inclusion may function to decouple policy and practice by working to promote positive achievement outcomes for SWD without necessarily altering the traditional nature of teachers' instruction to make it more targeted and individualized. On the other hand, Paper 3 shows how school organizational resources including PLCs and instructional coaches may help to couple policy and instruction if teachers "activate" their resources through high depth interactions. Still, not all resources were equally likely to couple policy and instruction. The design of these supports and the expertise that they provided to teachers mattered for shaping how teachers engaged with these supports and their likelihood for influencing their instruction.

My studies illustrate how school organization, and specifically the deployment of resources like PLCs, organizational routines, and coaches. can both couple as well as decouple policy and practice depending on their design and the context in which they are embedded. What factors seem to shape whether or not school organization will lead to instructional change as called for in policy? I theorize that special education policies require a bigger shift in the technical core of teaching, which may make the coupling of policy and practice more difficult to

achieve. For instance, inclusion challenges norms of teacher autonomy and requires major shifts in the way teacher roles and schedules are conceived, particularly in high schools where such norms are deeply embedded.

5.2 IMPLICATIONS FOR PRACTICE

On a practical level, these studies offer practical implications for policy makers at the local level. School and district leaders commonly seek to create meaningful opportunities for teacher collaboration as a means for teacher development and/or instructional improvement. Above all, having opportunities for collaboration with others is an essential precursor for such initiatives. As my studies showed, without sufficient opportunities for collaboration, teachers are unlikely to leverage the resources that they need to make changes to their practice based on policy pressures. However, simply having opportunities to collaborate is not sufficient. The design of opportunities for collaboration and the organization of schools is important for shaping whether or not collaboration can be meaningful to teachers and drawn upon as a resource for improving their practice. My studies suggest several practical implications for creating meaningful opportunities for teacher collaboration. First, leaders should consider what type of expertise could help teachers make instructional improvements, and think about how they could make teachers aware of this relevant expertise in others. Findings show that teachers' collaborations are influenced by their perceptions of others' expertise, but also that they can fail to recognize potentially relevant expertise in others and miss out on meaningful learning that could take place through collaboration. Others have suggested that leaders may be able to intervene and help teachers to locate relevant expertise in others (Baker-Doyle & Yoon, 2011; Wilhelm et al.,

2016). This may be a valuable first step in encouraging teachers to initiate collaborations with those who could benefit their development or to engage more meaningfully with those whom they already interact.

Second, leaders should harness teacher agency for creating meaningful opportunities for collaboration. These studies showed how teacher creativity and initiative allowed them to overcome formal organizational constraints to meet policy demands and collaborate in meaningful ways. Leaders could benefit from recognizing the meaningful connections that teachers have created for themselves and thinking about how to capitalize on these connections for improvement. For instance, Paper 3 showed that teachers found valuable sources of support for their math instruction in the form of informal mentors and planning partners who taught in other schools. Surfacing these important connections could help school and district leaders to better understand what resources teachers find to be valuable, what they believe they are missing in their school settings, and how they might support teachers in maintaining and strengthening their connections.

5.3 IMPLICATIONS FOR FUTURE RESEARCH

5.3.1 Methodological and conceptual approaches

These studies offer a number of implications for future research. First, organizational and systems frameworks leant to methodological approaches that may be a productive lens for future research on policy implementation. The theoretical influence of organizational routines (Paper 1), systems theory (Paper 2), and resource distribution, access, and activation (Paper 3) translated

to productive methodological approaches. Specifically, our conceptual focus in each paper helped to ensure that our methodological approach allowed us to systematically measure the following features that are salient in studying policy implementation: exploring practice broadly through teachers' collaborations, exploring the interplay between structure and agency, and using a multi-level approach to connect macro and micro elements (Spillane et al., 2009).

Furthermore, qualitative case study inquiry and inquiry focused on organizations is still relatively novel in special education research (Bray & Russell, 2016; 2018). Special education research tends to be dominated by single subject designs and studies of implementation that use a more narrow lens for studying implementation in terms of specific programs or practices. Paper 1 and 2 suggest that with too narrow a focus on special education practice and policy implementation, the realities of what transpires in the name of policy implementation may be missed.

Additionally, Paper 3 demonstrates the potential of a relatively novel protocol for learning about teachers' networks with an interactive interview protocol (Hogan et al., 2007). This interview protocol allowed us to connect rich qualitative descriptions with teachers' descriptions of their network ties. Surveys that are commonly used in social network research do not allow researchers to capture qualitative explanations about why and how teachers draw resources from their ties. At the same time, traditional interview protocols may not collect information about teachers' ties in a way that would lend to systematic comparison. Our semi-structured interview protocol afforded both of these methodological features, which allowed us to systematically compare teachers' access to and activation of resources through their networks while providing insight into how and why this occurred.

5.3.2 Research topics

In addition to providing viable conceptual and methodological tools for future policy implementation studies, our findings suggest directions for future research. First, our studies examined cases of schools and teachers facing the same broad policy pressures. Future studies could explore how the interaction between the distribution of different types of resources influences teacher access and activation. In Paper 3, we examine each type of resource separately, yet we know from other research that different types of resources interact to shape teacher collaboration (Cynthia E Coburn & Russell, 2008; Cynthia E Coburn et al., 2012). Additionally, future research could explore the connections between school distribution of resources and teacher routines. Paper 1 explores routines in depth, but does not attend to resources with the same level of specificity. On the contrary, Paper 3 systematically measures patterns of access to resources, but does not delve as deeply into the nature of teachers' interactions. Connecting these two lenses could provide important insights about how the distribution, access, and activation of resources may influence the depth and nature of teachers' patterns of collaboration over time. Finally, there is a need for continued research examining how school and district distribution of resources shapes teachers' access and activation of resources in their collaborations. In particular, other methods such as observations or logs of teacher interactions can provide deeper insight into teachers' activation of resources through their collaborations.

5.3.3 Policy research

Finally, these studies suggest future directions for policy research. At the time that these studies were conducted the Every Student Succeeds Act (ESSA, 2015) and the Supreme Court ruling regarding the interpretation of the Individuals with Disabilities Education Act (Endrew F. v. Douglas County School District) were either not yet in place or relatively recent. Both of these policy changes are likely to influence the efforts of districts, teachers, and schools related to collaboration for policy implementation with regard to inclusion and math instruction. Under ESSA, states have more autonomy to set their own accountability targets for academic achievement and for the ways in which they will support growth for SWD. The recent Supreme Court decision clarifies the intent of special education federal law to help SWD meet meaningful, challenging objectives rather than just minimal progress in the curriculum. Currently, little is known about how states and districts have interpreted these policies and how this interpretation translates into local policy efforts and district and school distribution of resources. Furthermore, researchers could contrast cases of state and district policies interpreting these laws in terms of how they influence school organization, resource distribution, and teacher collaboration in practice. Ultimately, such studies could explore how state and district interpretations of these policies may be effective in reducing the prominence of the accountability focus that shaped teachers' collaboration in these studies.

5.4 CLOSING

Teacher collaboration is a powerful tool for allowing schools to take on ambitious reforms and improve their educational outcomes. However, collaboration is not inherently productive and is enabled or constrained by the organization of schools and districts. My dissertation provides insight into schools, and patterns of teacher interaction within schools, as a valuable context for studying policy implementation. Schools are often examined as technical systems with a focus on teaching and learning processes, but these papers call attention to the human and social side of organizations that shape educational practice.

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