ORGANIZED IDEAS: HOW IDEA-BASED POLICY CHANGE SHAPES CONFLICT AND COLLABORATION IN DISTRICT-LEVEL INSTRUCTIONAL COACH TEAMS

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ABSTRACT

ORGANIZED IDEAS: HOW IDEA-BASED POLICY CHANGE SHAPES CONFLICT AND COLLABORATION IN DISTRICT-LEVEL INSTRUCTIONAL COACH TEAMS

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For the past two decades, educational systems have been undergoing significant institutional change. Over three-fourths of U.S. states have enacted teacher evaluation laws that link student growth on state standardized tests to performance rating. At the local level, federally legislated standards-based accountability regimes have shifted the attention of policymakers away from resource inputs and towards educational outputs. Accountability policies (e.g., high-stakes testing, teacher evaluation, merit-based pay, etc.) based on academic performance link standardized state assessments with evaluations of schools and teachers and apply constant pressure on educational leaders to improve student test scores. In response, research suggests that districts and schools are building capacities that professionalize teaching. Many districts have responded by hiring instructional coaches. Instructional coaches are typically experienced educators who, either on a part-time or full-time basis, provide ongoing, site-based professional development to teachers. This study examines political and institutional factors that influence district-level instructional coaching. This analysis is presented in a 3-essay format.

The first essay analyzes the evolution of macro-level policymaking trends through the lens of idea-based politics. Drawing on data from U.S. Congressional hearings, this study employs a longitudinal social network influence model to determine factors that supported opposing teacher quality policies. Findings support arguments that educational accountability reforms in the U.S. are ideologically driven as opposed to being based on research. The second essay is a single qualitative case study of one six-member instructional coaching team in a high-

performing school district in Indiana. This study shows that coaches can be a catalyst for a shift towards teacher professionalization. However, accountability pressures also forced policy choices that constrained teacher autonomy, restricted innovation, and limited knowledge exchange, particularly in mathematics. Finally, the third essay utilizes comparative case study analysis to investigate how instructional coach teams in two Indiana districts contribute to knowledge-building for standards-based policy implementation. My findings describe how coach teams develop institutional capacities that facilitate district policy implementation and teacher collaboration. Taken together, my second and third essays indicate the importance of new forms of knowledge-building and evidence use for professional learning.

To my biggest fans, my parents and my biggest supporter, Julian.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

KEY TO ABBREVIATIONS

CCSS – Common Core State Standards

EDM – Everyday Mathematics

ELA – English Language Arts

ESSA – Every Student Succeeds Act

I-STEP – Indiana Statewide Testing for Educational Progress

NCLB – No Child Left Behind

NGO –Non-Governmental Organization

NIC – Networked Improvement Community

PD – Professional Development

PLC – Professional Learning Community

PNA – Policy Network Analysis

REM – Relational Event Model

RTI – Response to Intervention

RTTT – Race to the Top

STEM – Science Technology Engineering and Mathematics

TFA – Teach for America

INTRODUCTION

Over the past few decades, policymakers have turned their attention to reforms aimed at changing classroom teaching, specifying what teachers should teach, sometimes how they should teach it, and how much students should learn. In particular, policymakers have enacted federal and state laws designed to hold schools – and more recently teachers – accountable for student achievement. Standards-based accountability reforms like these typically link students' test scores on standardized assessments with performance ratings. Scholars have characterized such changes as a paradigm shift away from additive policies (e.g., Title I compensatory education for at-risk students) of the past and towards policies that pressure educators to transform the instructional core of schools, often in the pursuit of higher test scores. Changing the instructional core of schools can, for example, include modifying the level of academic content, changing the required skills and knowledge of teachers, and shifting expectations for student learning and engagement (Elmore, 2000). In response, school districts have adopted instructional coaching to support teachers as they implement standards-based reform. Evidence suggests that pressure from high-stakes accountability policies to improve educational performance has accelerated the expansion of instructional coaching in recent years (Domina et al., 2015; Finnegan, Daly, & Liou, 2016).

Like many other educational reforms, instructional coaching is employed by school districts as a solution for raising student achievement by way of better instructional practice. For district leaders, the theory of action behind instructional coaching provides a clear way forward as a promising new form of professional development that is "content-based and intended to support teachers in meeting the aims of school- or district-based instructional reform" through "embedded and situated work that includes observations of classroom teaching, demonstration of

model practices, and cycles that includes pre- and post-conferences with practitioners" (Gallucci, Lare, Yoon, & Boatright, 2012, p. 922). In practice, coaching often involves striking a balance between mentoring individual teachers and engaging in whole-school, system-wide improvement (Knight, 2007; Knight & Nieuwerburgh, 2012). Even more important for the expansion of instructional coaching is an evolving policy context in which funding and technical assistance are now available to support and guide local leaders as they implement coaching in their districts. Race to the Top (RTTT) reforms, for example, rewarded many states and districts with grants that included coaching as an intervention strategy, while Title I funding is also now frequently earmarked for instructional coaching programs. Political science theory suggests that the simultaneous opening of a new federal revenue stream coupled with the growing popularity of instructional coaching policy has created a "policy window." Policy windows are characterized by a dramatic uptake of a particular policy instrument when the problem (i.e., issue definition), policy (i.e., proposed solution) and politics (i.e., the political will) "streams" associated with a particular reform – in this case instructional coaching – align in ways that thrust it onto the policymaking agenda (Kingdon, 1984). The growth in the scale and diversity of instructional coaching programs popping up across the country in a relatively short amount of time – over the past 5-7 years – speaks to this phenomenon.

Despite the growing popularity of instructional coaching there is no clear evidence – namely a rigorous, peer reviewed body of work – that coaching has a positive impact on teacher quality or student achievement. Research on school organization shows that instructional coach positions can support teacher learning and changes in classroom instruction (Biancarosa, Bryk, & Dexter, 2010; Camburn, 2010; Coburn, Choi, & Mata, 2010; Coburn & Russell, 2008; Firestone & Martinez, 2007; Mangin, 2009), but consistent findings on coaching effects are not currently

available. The growing consensus on instructional coaching seems to be that, while an improvement as compared to "one-stop" professional development models of the past, coaching does not necessarily improve classroom practice (Garet et al., 2008). At the same time, a growing number of case studies and some preliminary empirical analyses demonstrate the potential of instructional coaching for turning around low-achieving schools (Picucci, Brownson, Kahlert, & Sobel, 2002), improving teacher practice (Knight & Cornett, 2008), and raising student achievement (Biancarosa et al., 2010; Lockwood, McCombs, & Marsh, 2010). More uncertain is the array of factors that support instructional coaching programs, including the appropriate selection criteria, organizational model, and professional development plan (Bryk et al., 2015). Thus, like many educational interventions of the past, we have a limited understanding of what institutional and social conditions are optimal for cultivating effective instructional coaching practices (Bryk et al., 2015), or how to scale up successful coaching programs (Elmore, 1996).

This dissertation is presented in a three-essay format and explores factors that impact instructional coaching and district policy implementation in an environment increasingly focused on evaluating and improving teachers. Across three essays I show how idea-based policy change is linked to district policy implementation. In particular, I focus on how instructional coaches, manage systemic conflict stemming from competing ideologies for educational improvement. I argue that, as a district-level approach to educational improvement, instructional coaching represents a local political response to a decade and a half of federal and state accountability reforms. Using policy paradigm theory, I demonstrate how instructional coaches mediate between opposing paradigms for educational improvement – one based on teacher accountability and the other on teacher professionalism. I show how instructional coaches professionalize

teaching, while adapting district and school institutions to respond to external accountability demands. My findings indicate that teacher innovation and professional learning can be stifled when coaches build institutional resilience around standards-based accountability. The essays presented in this dissertation draw on data from two grant-funded research projects.

The first essay draws on data from a W.T. Grant-funded project, Financing the Policy Discourse. This essay introduces idea-based politics, a theme that threads throughout the remainder of the essays. I analyze the evolution of macro-level policymaking trends employing a longitudinal social network influence model to determine the explanatory factors for supporting opposing teacher quality policies: teacher accountability and teacher professionalism. I test the effects of prior policy preferences, organizational affiliation, and network position on support for teacher accountability and teacher professionalism. My findings support arguments that educational accountability reforms in the U.S. are ideologically driven as opposed to being based on research. My findings also show the usefulness of longitudinal network modeling for understanding the behavior of policy coalitions in educational contexts. While this kind of analysis is commonplace in studies that focus on the sociology of education (e.g., Frank, Zhao, & Borman, 2004), there is no such research base that focuses on the politics of education. My findings show how prior relationships between policy actors and policy preferences can be used empirically to predict support for future policy preferences.

The second and third essays draw on data from a W.T. Grant- and National Science Foundation-funded project, the Study of Ambitious Mathematics Instruction. The second essay in my dissertation is a single qualitative case study. In this essay, I examine the implementation behaviors of one six-member instructional coaching team in a high-performing school district during the 2015-2016 school year. Building off my analysis of the accountability-

professionalism paradigm conflict presented in Essay 1, I analyze how inherent systemic conflicts are experienced by instructional coaches. I use paradigm conflict to interpret internal contradictions in district improvement systems. I find that coaches can be a catalyst for a shift towards teacher professionalization. However, accountability pressures also forced policy choices that constrained teacher autonomy, restricted innovation, and limited knowledge exchange, particularly in mathematics. In my third essay, I employ comparative case study analysis to investigate how instructional coach teams in two Indiana districts – one urban and one suburban – contribute to knowledge-building for standards-based policy implementation. My findings describe how coach teams develop institutional capacities that enable districts to respond to external policy shocks. Taken together, my second and third essays indicate the importance of new forms of knowledge-building and evidence use for professional learning.

Overall, my research has important implications for questions of educational leadership and policy. First, my research on instructional coaching shows the importance of local educators for implementing district reforms, particularly in high-needs contexts. Coaches facilitated teacher collaboration and effective data use, which improved instruction and support for low-performing students. Second, my research on instructional coaching teams highlights an emergent form of district leadership. Coach teams can leverage district resources, including teacher social networks, in unique ways that fortify and improve system-wide reforms and decision-making. Third, my research on policy networks provides critical insight into the formation and activities of political coalitions in contemporary educational systems. This line of work helps explicate the macro-political origins of inequality generated by market-based reformers. Policy network analysis reveals the ideological connections amongst policymakers, research producers, and funders that favor elite-driven policymaking.

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ESSAY 1

POLICY NETWORKS, PARADIGMS, AND IDEA EXPOSURE IN THE TEACHER QUALITY DEBATE, 2001-2014

1.1. Purpose and Objectives

For the past two decades, educational systems have been undergoing significant institutional change. Over three-fourths of U.S. states have enacted teacher evaluation laws that link student growth on state standardized tests to performance rating. Federal and state policymakers of both major political parties have embraced standards-based accountability reforms that link student performance to teacher quality. At the local level, federally legislated standards-based accountability regimes have shifted the attention of policymakers away from resource inputs and towards educational outputs. Accountability policies (e.g., high-stakes testing, teacher evaluation, merit-based pay, etc.) based on academic performance link standardized state assessments with evaluations of schools and teachers and apply constant pressure on educational leaders to improve student test scores. In response, research suggests that districts and schools are building capacities that professionalize teaching.

Administrators have responded by, for example, hiring instructional coaches and developing teacher-led decision-making models that rebuff accountability models, which are based on individual merit and competition. In teacher evaluation, meanwhile, the predominance of student test score growth is under intense scrutiny. Recent policy trends indicate a significant change of course from test-based accountability to evaluations that include multiple measures (Grissom & Youngs, 2016). How did the political dimensions of teacher accountability policy

evolve over time and what can we expect in the future? To answer this question, I focus on the normative dimensions of these reforms, building on existing research that examines the roles of ideas, knowledge, and informal networks in shaping educational policy agendas.

This essay examines the evolving politics of teacher accountability from 2001 through 2014. This time period includes the enactment of the federal No Child Left Behind (NCLB) legislation in 2001 and the federal Race To The Top (RTTT) policy in 2009, the hallmark policies of the presidential administrations of George W. Bush, a Republican, and Barack Obama, a Democrat. Despite apparent ideological schisms, both policies promoted performance-based accountability reforms. A number of scholars have argued that teacher policy is embedded in conflict over the proper role of market-based ideology in distributing public goods, like education (cite Henig, others). From this point of view, the rapid expansion of accountability policies is connected to the rise of a new policy paradigm, or way of problematizing and solving educational issues. Market-based policies focus on individual competition, sanctions and rewards for teachers and schools. Critics of teacher accountability paradigm, meanwhile, have identified an opposing paradigm for improving teacher quality: teacher professionalism. Building on this literature, I draw on a dataset of education policy actors and their testimony on teacher quality issued in the U.S. House of Representatives over a 14-year period (2001-2014). Using policy network analysis, I examine two-mode networks of policy actors and beliefs about teacher accountability and teacher professionalism. The literature review and theoretical framework sections that follow review research on idea-based policy change and feature an overview of policy network analysis and the substantive dimensions of teacher quality beliefs.

1.2. Literature Review

From the norm-based perspective, which highlights the cultural role of ideas in shaping policy solutions, accountability reforms of the past 15 years are ideologically driven. In the current era of standards-based accountability, this phenomenon is exemplified by external testing regimes based on performance-based logics from private business practice. Research indicates that the business sector has seen their institutional norms written into educational policy (Mathis & Trujillo, 2016). Reforms like value-added teacher evaluation and merit-based pay, for example, are based on theories of individual rationality that largely ignore historical, cultural, and social factors. Standards-based accountability, meanwhile, is rooted in theories of human motivation and performance from business schools. Market-based policies privilege the "rational" information of outsiders and empower non-educators to wield increasing power over classroom life.

According to Mehta (2013), accountability systems attempt to "rationalize" the educational profession by quantifying teacher practice using external logics of action (i.e., those that do not derive from the educational field). Mehta (2010, 2014) asserts that teaching is a "weak profession," leading to cyclical confrontations with external fields that want to reform schools. Movements in the 1920s and 1970s, making similar claims about poor educational quality, sought top-down management of teacher practice under technocratic accountability systems. Teacher evaluation laws represent major, dynamic policy changes that have upended traditional educational politics.[1] If the traditional left-right spectrum of political beliefs drove interest group behavior, then Democrats and Republicans would be in conflict over educational issues. In recent years, however, the opposite has been true. Instead, accountability reforms,

[1] Historically, teachers have been targets of educational reform.

charter schools, and teacher evaluation laws, for example, have received widespread support from members of both majority political parties (Galey, Reckhow & Ferrare, 2016). Both the Bush and Obama administrations supported policies opposed by established educational interest groups, most prominently teachers. Teachers unions, which are typically viewed as the most powerful interest group in educational systems, have been unsuccessful at curbing the expansion of teacher evaluation laws (Moe, 1990; Add more recent cite). Critics argue that teacher evaluation laws challenge the professional environment educators need to carry out their work. Some unions have tried to work within the accountability framework, an approach called "union reformism" (Bascia & Osmond, 2012), but the relative weakness of educational professionals in asserting political authority over the past 15 years is puzzling.

Accountability policies that focus on outputs and efficiency have dominated educational policymaking since the 1980s. These policies are contrasted with opposing ideas about teacher quality and educational improvement that elevate the professional autonomy of teachers, or teacher professionalism. In general, educators subscribe to the tenet that teaching is a profession and that, as professionals, teachers should have decision-making power over instructional choices in their classrooms. There is some evidence that policy experts are migrating away from a narrow definition of teacher quality based on test score growth. Many, for example, advocated the use of multiple teacher evaluation measures, which incorporates other metrics of teacher quality. While far from granting teachers the kind of professional autonomy granted to doctors or lawyers, multiple measures grant more deference to local educators over the evaluation process.

Meanwhile, a growing number of researchers are partnering with local educational communities to empower teacher decision-making over instructional policy (Frank, 2014; Smylie, Conley & Marks, 2002). Such reforms collectively represent the concept of "teacher-

led" schools (Myers, 2013), which aim to empower teachers by giving them a voice in local reform initiatives. Another example is peer-to-peer mentoring and instructional coaching. Emerging trends in teacher professional development indicate that the popularity of coaching policies has increased substantially in recent years; the staffing rate of coaches has roughly doubled over the past 15 years. (Domina et al., 2015, Gallucci et al., 2010).

Network theory contributes to this discussion, suggesting that modern political organizations emphasize the symbolic dimensions of public policy. Policy actors tend to focus on shaping and manipulating policy symbols and ideas by, for example, creating new knowledge, influencing public opinion, and utilizing opportunistic political strategies (Kadushin 2012). Thus, contemporary policy change can be conceptualized as two-mode networks of actors and policy ideas.

1.3. Theoretical Framework

The relationship among institutions, networks, and political cooperation is an enduring question in political science and public policy scholarship (Sabatier, 2007). The first credited use of the term "policy network" appeared in an article by Peter Katsenstein (1976) comparing the foreign economic policies of the United States and France. In the four decades that followed, policy network analysis (PNA) evolved from a descriptive metaphor about the interconnectedness of political actors to an independent field of research that showsthat formal network concepts and statistical models of policy networks can yield important insights into network formation, collective action, policy outcomes, and structural configurations (Lubell, Scholz, Berardo, & Robbins, 2012; Knoke, 2011).

The development of PNA in political science was an outgrowth of research on interest groups and agenda setting. Foundational literatures vary topically and encompass a range of network approaches to public policy analysis, including studies of political elites (Laumann & Pappi, 1976), organizational interest groups (Laumann & Knoke, 1987), policy communities (Rhodes, 1990), interest intermediation (Marsh & Rhodes, 1992; Marsh & Smith, 2000), and forms of networked governance (Kenis & Schneider, 1991; Rhodes, 1995; Schneider, 1992).

The main objective of PNA is to identify the important actors involved in policymaking institutions, to describe and explain the structure of their interactions, to discuss the implications of those structures for policymaking, and to explain and predict policy outcomes and collective policy decisions (Knoke, 2011). According to PNA theory, policy networks consist of individual actors, groups of actors, and organizations operating within a "policy subsystem," which includes a broad range of private and public actors and consists of major coalitions that work together differently depending on the policy context. The analytical value of this approach can be found in its conceptualization of policy-making as a process that involves a diverse and interactive set of actors working together over time and across multiple levels of the government to influence and change policy. As defined by Rhodes (2006, p. 424):

> "Policy networks are sets of formal institutional and informal linkages between governmental and other actors structured around shared if endlessly negotiated beliefs and interests in public policymaking and implementation. These actors are interdependent and policy emerges from the interactions between them."

Thus, the basic building block of policy networks involves the bargaining between actors with resources in an environment where power structures are shaped by formal institutional arrangements and influenced by informal relationships.

One way to gain power in policy networks is by exerting influence on policy discourse. Discourse networks focus on the relationships between organizations and policy ideas, or the "discursive layer" of politics. Policy discourse defines the ideological contours of the policy subsystem which ideas policy actors are debating, and thus, which ideas are considered legitimate policy options and which ones are not. A discourse network is constructed by analyzing actors' attitudes expressed in a public arena (e.g,. national media, congressional hearings) and creating ties from affiliations between actors based on shared views (Leifeld 2013). Discourse network analysis links social network analysis to content analysis, providing a way to combine the study of actor relationships with the content of their policy beliefs (Leifeld 2013). Major ideological shifts, or paradigm shifts, can be detected by examining changes in policy discourse networks over time (Leifeld 2016).

PNA is used increasingly in research on educational politics to understand the effects of various interest groups on policymaking. A number of research studies, for example, indicate that foundations and think tanks act as intermediaries in policy networks and may act as informational gatekeepers between policymakers and the public, constricting and shaping the policy discourse (e.g., Reckhow, 2013; Scott & Jabbar, 2014). In this respect, PNA research indicates that nongovernmental organizations (NGOs) often shape policy by mediating informational flows between state and non-state actors (Heaney & Leifeld, forthcoming). Other studies, meanwhile, have used PNA to trace links between philanthropic funding and the expansion of charter schools and alternative certification programs (Au & Ferrare, 2014; Ferrare

& Reynolds, 2016; Reckhow & Snyder, 2014). Reckhow and Snyder (2014), for instance, illustrate how major foundations have converged their funding flows to a select number of alternative service providers (e.g., TFA), which has enabled the rapid growth of these non-profit organizations.

In this analysis, I use discourse network analysis to test how the competing paradigms of efficiency and professionalism evolved from the George W. Bush to Obama eras. My review of the literature indicates that the discourse networks of these belief systems may have evolved differently over time. Research suggests, for example, that intermediary organizations, such as think tanks and foundations, have played a prominent role in the expansion of accountability policies (Schneider, 2011; Weisburg et al., 2009). Relatedly, foundation funding, which often supports the activities of intermediaries, has been linked to a convergence of policies related to accountability reforms. In contrast, advocates of teacher professionalism have relied less on intermediary organizations and more on traditional policy actors, such as teachers' unions and university schools of education, to forward their agenda (Polishook & Cortese, 2000; Zeichner, 2014). To investigate and compare how these two discourse networks changed over time, I examined three research questions:

1) Did the discourse among policy actors during the Bush administration influence future policy preferences during the Obama administration?
2) What factors influenced the evolution of policy beliefs about professionalism and efficiency from the Bush to the Obama administration?
    a. Did intermediary organizations play a major role?
    b. Did exposure to research or grant funding play a major role?

3) Were there any similarities and/or differences in the evolution of policy ideas between the efficiency and professionalism paradigms?

1.4. Methods

To address my research questions, I employ longitudinal social network analysis. Using a two-mode dataset of actors and events I test actors' exposure to particular policy ideas, as well as their exposure to research use and grant-funded organizations. I employ an event-based influence model to specify my exposure terms. My analysis focuses on understanding how exposure to ideas influences the policy discourse in both the efficiency and professionalism paradigms. I also aim to understand how policies evolve similarly or differently in each of these issue areas.

1.4.1. Data

Drawing on data from a William T. Grant-funded project directed by Dr. Sarah Reckhow, this essay provides a comprehensive macro-level policy framework for interpreting the normative dimensions of teacher quality policy over the past 15 years. The dataset in question derives from 197 congressional hearings from 2000 to 2012 that contained substantive content on teacher quality and teacher preparation. The hearings were downloaded from the U.S. Government Printing Office website and then coded for policy preferences related to beliefs about teacher quality. All witness testimony and opening statements by members of Congress were included. Coded statements were compiled using the Discourse Network Analyzer software developed by Leifeld (2016), which constructs two-mode discourse networks based on shared policy preferences. This dataset also included organizational date on philanthropic foundation funding and research use by intermediary organizations.

The coding focused on analyzing two broad categories of policy preferences meant to operationalize two policy paradigms. First, I identified preferences related to the belief that teacher quality could be improved by introducing competition and addressing efficiency—an emphasis on economic cost-benefit and optimization of policy performance (Wood & Theobald, 2003). Second, I identified policy preferences related to teacher professionalism, which involve providing educators more autonomy over instructional choices and training. In this analysis, I focused on predicting two categories of actors' beliefs – one from each set of ideas concerning teacher quality – and I developed lists of specific policy preferences associated with each belief.

The two broad categories, or policy paradigms, are teacher accountability for efficiency and teacher professionalism. Table 1.1 shows the various policy preferences associated with each belief system.

Table 1.1. *Outcome variables for efficiency and professionalism*

Efficiency	Professionalism
• Teachers must be evaluated and held accountable • Use evaluation systems with value-added models • Use evaluation systems with growth models • Use evaluation systems with classroom observations • Use evaluation systems with multiple measures • Use evaluation systems with peer reviews	• Teaching is a profession and/or teachers are professionals • Involve teachers in developing reforms to teacher policy • Include teachers' unions in negotiating the parameters of employment • Maintain tenure system with seniority • Raise teacher pay and/or benefits in order to make teaching a more attractive career • Improve working conditions to make teaching a more attractive career (examples- reduce class size upgrade facilities)

To determine the structure of the efficiency networks, I also included beliefs related to school-based accountability, a key antecedent to teacher-based accountability; incentive-based policies, like merit-based pay; and teacher preparation. Recent policies have intensified accountability

pressures on traditional teacher preparation programs by, for example, linking program quality to test scores. Excluding these issue areas would result in an incomplete depiction of the policy network. Both types of policies reinforce core efficiency beliefs and may increase the likelihood that actors will also support teacher-based accountability. Likewise, I included two other issue areas to map the structure of the professionalism network. In addition to teacher professionalism, I included beliefs about capacity-building for teacher collaboration and traditional teacher preparation. A complete list of the coding categories is included Figure A.1.1 in the Appendix.

1.4.2. Hypotheses and Model

Network analysis provides a systematic approach for capturing the normative relations among policy actors in a subsystem. Political scientists have typically favored network selection models, particularly exponential random graph models (ERGMs) and quadratic assignment procedures (QAPs) to test hypotheses related to idea-based theories of political behaviors, including political paradigms (e.g., Leifeld, 2015; Galey et al., 2017). In particular, research in discourse network analysis, which measures the normative dimensions of public policy subsystems, utilizes a range of selection models to draw inferences about idea-based political processes (Leifeld, 2013, 2016).

In this essay, I take a different approach, drawing on methods in longitudinal social network analysis that analyze social influence. This influence process can be estimated several ways. Here I adapt the model of social influence popularized by Kenneth Frank (e.g., Frank, Zhao & Borman, 2004; Frank, Zhao, Penuel & Ellefson, 2011). I extend Frank's model, which estimates a particular belief or behavior as a function of the prior behavior of others, as well as prior beliefs. In this case, I examine organizations rather than individuals. Note that the inference of influence is indirect – influence is assumed if organizations change their behaviors in the

direction of the average behavior of those in their network. The term used to estimate influence is called an exposure term. Here I use the term idea exposure to indicate exposure to the ideas of others. Following the logic of influence models, a positive coefficient for idea exposure will indicate that the higher the level of average support for a particular policy preference of those in one's policy network, the greater the likelihood of also adopting that point of view. In other words, if an organization is exposed to positive sentiments about teacher accountability during the Bush administration, for example, that organization is more likely to support teacher accountability during the Obama years.

Policy beliefs and preferences are dynamic and overlapping, which presents an analytical challenge. Namely, concepts embedded in policies, like school choice or accountability, may transform over time. Take performance-based accountability for example. During the Bush administration, policymakers focused on test-based accountability. However, during the Obama administration, this idea evolved to focus on teacher-based accountability. Thus, examining policy beliefs over an extended period of time, as this study attempts to do, must also consider policy beliefs related to the belief of interest. As discussed, to account for this characteristic of policy beliefs, I include other beliefs associated with the core belief of efficiency.

A second major issue is the composition of policy actors participating in the policy subsystem over time. Most actors do not continuously participate in the policy debate, but rather move in and out of the policy system. Thus, many of the actors present in the Obama administration, which was used to estimate the outcome variable, were not active in the Bush administration (and vice versa). All actors that testified before Congress from 2010 to 2014 were included in the final sample. In this sample, however, only 54 of the 178 actors had expressed policy preferences during both time periods, limiting the sample size that could be examined.

Hypotheses: My analysis is divided into three broad hypothesis that test different types of exposure to policy ideas, as well as how actors are exposed to different policy ideas. The first hypothesis addresses idea exposure, or what kinds of policy ideas actors are exposed to during important periods of policy change. The second and third hypotheses, meanwhile, examines how actors are exposed to ideas. The second hypothesis tests exposure to intermediary organizations, while the third hypothesis tests the effects of research use and philanthropic funding.

Idea Exposure: Various studies of policy networks have illustrated that information exchange between actors has consequences for policy-making (Pappi et al., 1993; Leifeld & Schneider, 2012). Regular information exchange is frequently used as a proxy for inter-organizational alliance. Discourse network analysis, meanwhile, argues that discursive interaction is conditioned by these collaborative ties (Leifeld, 2016, 2017). Moreover, politics is attention-driven (True, Jones & Baumgartner, 2007). Actors pay more attention to what peers in their network say than outside actors or strangers. Politicians and interest groups, for example, are more likely to anticipate a statement in the media if they have institutional ties to the author of that statement. In other words, members of policy networks rely on network ties to transmit and legitimize policy ideas and solutions in order to shape policy outputs and outcomes, while also relying on institutional rules and norms to guide their decision-making. Thus, actors gather informational signals from the policy environment, which is institutionally and epistemologically bounded. In diffusion terms, regular exposure to particular policy ideas at events raises the likelihood of adopting the same ideas.

Hypothesis 1: Idea exposure to policy preferences in policy discourse networks will influence future policy preferences.

H_{1a}: If ego supports policy preference at Time 1, ego is more likely to support that policy preference at Time 2.

H_{1b}: If ego is exposed to Time 1 policy preferences at events in which ego participated between Time 1 and Time 2, ego is more likely to support that policy preference at Time 2.

This variable was constructed by analyzing the events, or Congressional hearings, each network actor attended during the 2007-2009 policy window. Each hearing was assigned a preference score that reflected the number of times policy actors appeared and testified in support of a particular set of policy preferences. As discussed, this included the actual policy preference of interest – either teacher-based accountability or teacher professionalism – as well as the other, related ideas from that paradigm. For example, if Actors A and B testified at a particular hearing in favor of both teacher-based accountability and value-added models – with each supporting two policy preferences from that paradigm – the hearing was assigned a score of 4. Finally, to create the exposure score for each actor, I calculated the mean of the preference scores for each hearing that actor attended. For example, if Actor A attended 3 hearings with scores of 4, 5, and 9 they received an exposure term of 6 (18/3).

Intermediary Organizations: The second hypothesis aims to test whether or not particular types of interest groups exercise any influence on the future policy preferences of actors. As Leifeld (2016) writes, "They are at the top of the contagion hierarchy and infect others with their claims" (p. 228). Actors skilled at forwarding new ways of thinking about policy issues have a special place in policy networks, as well as policy change theory in general. Hypothesis testing focuses on intermediary organizations, which often act as coordinators or idea brokers across institutional and political boundaries (Galey et al., 2017). Hypothesis 2 also tests whether or not

policy actors are more susceptible to idea exposure during policy windows. During periods of dynamic policy change called policy windows, idea brokers may bridge institutional arrangements by brokering informational processes through diffuse issue networks (Zahariadis, 2007; Galey et al., 2017). Altogether, this set of hypotheses posits that intermediary organizations and idea brokers have a prominent agenda-setting role in policy networks.

Across policy domains, and prominently in educational subsystems, researchers have identified non-governmental organizations, called intermediary organizations, that fill important gaps in information between different sectors of policy systems. In educational domains, a well-funded array of think tanks, philanthropic foundations, and nonprofit organizations, exert considerable influence over policy agendas (Debray et al., 2014; Trujillo, 2014). In a number of urban school systems (e.g., Denver, New Orleans, New York City), intermediary organizations appear to occupy key positions in network hierarchies of research information, acting as "hubs" of information for local actors (Scott et al., 2014). They play a critical role in brokering key research findings and policy reports in ways that filter out policies they oppose, while casting their preferred policy options in a positive light. In this way, intermediary organizations are able to leverage their position of "expertise" within district reform networks in order to influence the policy agenda.

Hypothesis 2: Exposure to intermediary organizations will influence future policy preferences

H_{2a}: If ego is exposed to Time 1 policy preferences at events with an intermediary organization present, ego is more likely to support that policy preference at Time 2.

Importantly, the exposure to intermediary organizations was not coded to reflect support or opposition to a particular policy position. Rather, events were coded for the overall presence of

intermediaries. For example, if three of the policy actors at Event A were intermediaries, then that event received a score of "3." Thus, the values for intermediary influence were the same in both the accountability and the professionalism discourse networks, while this hypothesis is aimed at a comparison between the two networks. Next, my final set of hypotheses addresses exposure to ideas through research specifically.

Research Use and Philanthropic Funding: Evidence indicates that information transmission within and between members of policy networks can be characterized by interactions over research utilization. Case studies, for example, have documented the political use of research evidence by intermediary organizations that promote charter schools and alternative certification policies (Scott, Lubienski, Debray, & Jabbar, 2014). Grant funding is another major potential source of influence in policy networks and was investigated in a similar manner. A substantial body of work demonstrates that shared grant funding amongst organizations yields convergence around particular sets of policies beliefs (e.g., Reckhow & Snyder, 2013).

Hypothesis 3: Exposure to actors that use research and actors with philanthropic funding will influence future policy preferences.

H_{3a}: If ego is exposed to actors that cite research at events, it will affect the policy preferences that ego supports at Time 2.

H_{3b}: If ego is exposed to actors that have received philanthropic funding at events, it will affect the policy preferences that ego supports at Time 2.

Hypothesis 3a draws on data about research citations made by indicating how often organizations used research evidence. Again, like exposure to intermediary organizations, the research citations were not coded to reflect support or opposition to a particular policy position.

The main thrust of these exposure terms was to draw a comparison between the efficiency and professionalism paradigms. In other words, is either paradigm more or less influenced by research evidence? Moreover, in many cases, the nature of the research and the presentation of the research do not lend themselves easily to this kind of decisive, valued assignment of a particular ideology. Hypothesis 3b, meanwhile, draws on data about grant funding that indicates whether or not a policy actor is supported by a major foundation. Like the research citations, the grant funders were not coded to reflect support or opposition to a particular policy position and similarly the question of interest was whether or not grant funding swayed policy preferences in either discourse network. Events were coded for the overall presence of grand-funded organizations, while the values for the influence of grant funding were the same in both the accountability and the professionalism discourse networks. For example, if five of the policy actors at Event A were funded by major grants, then that event received a score of "5." This hypothesis is aimed at a comparison between the two discourse networks.

Model: Formally, I let policy preferences represent whether or not policy actor *i* supported a particular policy belief. This is modeled as

$$
\begin{aligned}
&\textit{Support for policy belief} = \beta_0 \\
&+\beta_1 \textit{ prior support for policy belief of actor } i_i + e_i \\
&+\beta_2 \textit{ exposure to policy beliefs during events in network of actor } i_i \\
&+\beta_3 \textit{ exposure to research during events in network of actor } i_i \\
&+\beta_4 \textit{ exposure to grant-funded actors during events in network of actor } i_i \\
&+\beta_5 \textit{ exposure to intermediaries present during events in network of actor } i_i \\
&+ \beta_6 \textit{ flag for imputed data} + \\
&+\beta_{7\ldots n} \textit{ prior support for related policy beliefs of actor } i_i + e_i
\end{aligned}
\tag{1.1}
$$

where the error terms (e_i) are assumed to be independently distributed, $N(0,\sigma^2)$. Note that all outcomes, as well as measures of prior support for policy beliefs, are binary. Outcomes included data from 2010-2014, while prior behavior and exposure were estimated using data from 2001-2009. These decisions were made based on the political context and support for policy trends over time. Figures A.1.2 and A.1.3 in the Appendix show the trends in support for the two outcome variables over time.

The term associate with β_1 is a binary variable for whether or not actor i_i had expressed support for the policy belief in question prior to 2010. For all the exposure terms, policy actor i's policy network was estimated using bipartite data of actors and events from 2007 to 2009. This time period, 2007 to 2009, was identified as a key policy window as defined by the theoretical mechanisms for idea diffusion in policy networks (see, for example, Reckhow et al., 2016). There was a major shift in power from the Republican Party to the Democratic Party in the U.S. Congress in November 2006, presenting a critical opportunity for new actors to influence the policy trajectory. The number of actors present in the policy network during 2007 increased substantially from 2006. While this number dipped in 2008 – a general characteristic of election years – there was another mushrooming of new actors in 2009. Significantly, the election of Democrat Barack Obama to the White House in 2008 further consolidated Democratic control of the policy agenda.

Thus, the two-mode exposure terms were constructed based on the events that actors participated in from 2007-2009. Overall, each model included four exposure terms (β_2, β_3, β_4, β_5). First, I created an exposure term for the kinds of beliefs actors were exposed to during the events (β_2), which were specific days of testimony in Congress. The events in question are Congressional hearings on education policy issues. For example, the hearing entitled, "Federal

STEM Education Programs," took place on June 6, 2007. Each event was assigned a score based on the policy preferences discussed at each event. I then created a bipartisan list of actors and events with weights for each event. I calculated weights for both the sum of efficiency beliefs and professionalism beliefs to estimate models in each of the issue areas. Next, I also created weights for how often research was discussed (β_3), how often organizations funded by major foundations testified (β_4), and how often intermediaries were witnesses during this time period (β_5). I used the sum of weights for each event for all exposure terms.

Only 40 of the policy network actors were present during the policy window requiring imputation for 14 cases, which I carried out using the mean of available cases. I included a "flag" variable for these cases (β_6) to control for whether or not the policy actor had imputed exposure data. Finally, I also included prior support for related beliefs in each of the policy paradigms (see Figure A.1.1 in the Appendix for a complete list of preferences). The last two set coefficients in the model ($\beta_{7\ldots n}$) control for support for beliefs in the same policy paradigm. All of these variables were binary.

1.5. Results

The main findings are displayed in Tables 1.2 and 1.3. Note that all coefficients have been transformed into relative risk ratios, or odds ratios, to allow an easier interpretation of the logit coefficients. The odds ratios are the exponentiated value of the logit coefficients. Take, for example, the effects for prior beliefs in Model 1 of Table 1.2, which has a coefficient of 7.722 and is significant at the $p<0.1$ level. Keeping all other variables constant, when β_1 (i.e., prior beliefs) increases by one unit, the odds the outcome is in the 1 versus 0 category increase by a factor of 7.722. In other words, the odds of the outcome being in the 1 category (as opposed to

the 0 category) are 672.2% higher when β_1 moves one unit (4.696 – 1). The standard errors that appear below each coefficient are the original values. For both outcomes, I analyzed how prior policy beliefs and event-based exposure to policy beliefs, research, grant-funded organizations, and intermediaries influenced future policy beliefs. In both tables, Model 1 shows the results for prior policy beliefs only (Hypothesis 1), Model 2 shows the results for the event-based exposure terms controlling for the main prior belief (Hypotheses 2 and 3), and Model 3 presents the full analysis.

Table 1.2. *Models for teacher-based accountability*

	(1)	(2)	(3)
Prior support for teacher-based accountability	7.722**	5.470*	5.516*
	(0.877)	(0.944)	(0.965)
Prior support for school-based accountability	0.959		1.161
	(0.678)		(0.802)
Prior support for incentive policies	5.333**		5.744**
	(0.708)		(0.767)
Prior support for teacher preparation accountability	1.356		1.290
	(0.704)		(0.785)
Exposure to efficiency beliefs		1.006	0.997
		(0.010)	(0.012)
Exposure to research		0.998	0.976
		(0.173)	(0.190)
Exposure to major funders		1.083	1.126
		(0.458)	(0.571)
Exposure to intermediaries		0.742	0.743
		(0.530)	(0.659)
Flag for Imputation		0.535	0.265*
		(0.723)	(0.727)
Constant	0.454	0.221***	0.137***
	(0.603)	(0.565)	(0.002)
Observations	54	54	54
Log Likelihood	-32.010	-28.782	-28.556
AIC	78.019	67.564	77.111
Note: *p<0.1; **p<0.05; ***p<0.01			

Table 1.3. *Models for teacher professionalism*

	(1)	(2)	(3)
Prior support for teacher professionalism	1.444	1.677	1.120
	(0.784)	(0.969)	(1.037)
Prior support for capacity-building	0.717		0.397
	(0.765)		(1.009)
Prior support for teacher education	3.794*		2.739
	(0.796)		(0.975)
Exposure to professionalism beliefs		1.030	0.987
		(0.027)	(0.378)
Exposure to research		1.710**	1.673*
		(0.261)	(0.268)
Exposure to major funders		0.357	0.349
		(0.458)	(0.711)
Exposure to intermediaries		0.328	0.354
		(0.960)	(0.711)
Flag for Imputation		2.051	2.158
		(0.930)	(0.949)
Constant	0.136***	0.074***	0.075***
	(0.575)	(0.940)	(1.005)
Observations	54	54	54
Log Likelihood	-25.068	-21.103	-20.098
AIC	58.137	56.207	58.196
Note:	*p<0.1; **p<0.05; ***p<0.01		

There is some evidence to support Hypothesis 1, which posits that actors' beliefs are dependent on prior beliefs. Table 1.2 shows the results for predicting support for teacher-based accountability. Across all three models, prior support for teacher-based accountability was a strong predictor of future support for teacher-based accountability. Other kinds of efficiency beliefs, specifically incentive-based policies, also had a positive and significant effect on support for teacher-based accountability. The full model shows that actors are 5.516 times more likely to support teacher based accountability if they previously supported teacher-based accountability and that actors are 5.744 more likely to support teacher-based accountability if they previously

supported incentive-based policies.[2] There is less evidence for the dependency of prior beliefs in Table 1.3, which shows the results for predicting support for teacher professionalism. Prior support for teacher professionalism had no effect on the outcome, while prior support for traditional teacher education had significant and positive effects in Model 1. However, once the exposure terms are included in the model (Model 3), this effect is no longer present.

There is also some evidence to support Hypothesis 3a, which posits that exposure to research will influence support for policies. In Table 1.3, Models 2 and 3 show positive and significant effects for exposure to research when predicting support for teacher professionalism. Tests for collinearity (see Table A.1.2 in Appendix) show inflation in the standard errors of approximately 35% relative to when this variable is isolated in its own model. This indicates there may be some collinearity issues, however the inferences do not change as both coefficients are positive and slightly less than twice their standard errors. There was no similar evidence that exposure to research predicted support for teacher-based accountability in Table 1.2. Finally, there is no evidence in any of the models to support Hypothesis 2 (exposure to intermediary organizations) or Hypothesis 3b (exposure to organizations funded by major foundations).

1.6. Discussion and Conclusion

Although these findings provide some support for the hypotheses, there are problematic aspects of the analysis. At best, the results presented in this paper are preliminary and descriptive. Principally, the sample size (N=54) is too small to draw any firm conclusions. Long (1997) recommends a minimum of 100 participants for logistic regression; analyses that fail to

[2] Tests for collinearity (see Table A.1 in Appendix) show some inflation in the standard errors, around 20%, which raises some concerns. The two significant coefficients, however, do not change much in size or direction leaving the inference intact.

meet this threshold can result in coefficients that are artificially large. A reanalysis of the data using Firth's (1993) Penalized Likely Maximum procedure, which estimates more conservative coefficients, showed that the main results for both models were still positive and significant, although with much smaller coefficients (about half the size). Even so, more observations are needed to adequately explore the effects of idea exposure using an influence model. Alternatively, a different network model may be more appropriate for this type of data. One possibility is a relational event model (REM), which would analyze dynamic group processes that tackle nuanced concepts that do not conform to what Abbott (1988) referred to as "general linear reality." Many analytical models rely on the notion that the social world is comprised of fixed entities with measurable attributes, both of which can be measured at different time points. Differently, REM creates a history of group interactions, discerning which patterns of group interaction are more or less common than others over time (Butts, 2008). Importantly, REM models can account for the level of important of different events and different compositions of actors over time (Vu, Pattison, & Robins, 2015).

The results highlight key differences in how the policy paradigms for teacher efficiency and teacher professionalism evolved. My findings suggest that prior beliefs were more important for predicting support for teacher-based accountability than teacher professionalism. One interpretation of this difference is that ideology plays a more prominent role in shaping policy actors' beliefs about teacher accountability. Past research supports this notion. A number of studies suggest that advocacy coalitions supporting market-based policies, like teacher accountability, develop "echo chambers" of information promoted by intermediary organizations (Goldie et al., 2014; Jabbar et al., 2014). Within such echo chambers, particular research studies

and non-peer-reviewed evidence are referenced repeatedly by intermediaries to ensure that particular ideas about reform dominate the policy discourse.

In contrast, ideology appears to play a more minor role within the policy discourse over teacher professionalism. Research, on the other hand, has a prominent effect. This suggests that research is more important for developing policy beliefs that support teacher professionalism. The research effects indicate that political discourse within the professionalism paradigm adheres more closely to traditional models of policy learning (Sabatier, 1988). Policy learning theory suggests that actors are exposed to new knowledge, like research evidence, and experiences that influence their policy beliefs. Notably, exposure to research has no discernable effects for predicting policy beliefs within the efficiency paradigm. Taken together these findings suggest there may be a trade-off between idea-based politics and evidence-based policy learning.

While the analysis presented in this essay cannot be generalized to a larger population of policy actors or to different policy topics, this study shows the potential that discourse network analysis has for making both theoretical and substantive contributions to our understanding of contemporary educational policymaking. Future studies may consider including a closer examination of the types of research used, including research linked to specific policy solutions, to better understand how research affects policy preferences. Much of the current literature focuses on how research is used within coalitions that advocate market-based policies, particularly charter schools. Less is known, however, about how research impacts the broader policy space. Future research could also more closely examine the role of different types of organizations and policy actors in shaping policy discourses. Past studies have considered, for example, how policy entrepreneurs spread reforms, but few have done this in a systematic, empirical way. Multiplex network analysis that incorporates multiple networks, such as state

discourse networks and media discourse networks, alongside each other is another potential avenue for future research. Overall, discourse network analysis provides a range of possibilities to build on our current understanding of educational policymaking.

APPENDIX

Figure A.1.1. *Policy beliefs used to construct policy networks**

Efficiency: an emphasis on economic cost-benefit and optimization of policy performance versus limited attention to input-output considerations

Teacher-based Accountability
- *Teachers must be evaluated and held accountable*
- *Use evaluation systems with growth models*
- *Use evaluation systems with multiple measures*
- *Use evaluation systems with student feedback*
- *Use evaluation systems with classroom observations*
- *Use evaluation systems with value-added models*
- *Use evaluation systems with peer reviews*

School-based Accountability
- Hold schools accountable for student performance
- Maintain/establish a system of annual high stakes test
- Use school level testing to assess teacher quality

Incentive-based Policies
- Teachers and educational leaders respond to performance-based incentives
- Use pay for performance
- Use performance measures for personnel decisions (retention/dismissal, promotion, and/or tenure)
- Use federal funds to incentivize states and districts to adopt teacher quality reforms

Teacher Preparation Evaluation
- Teacher preparation and professional development must be more efficient and effective
- Use teacher evaluation systems to assess the quality of teacher preparation programs
- Use evaluations to improve professional development
- Use evaluations to provide ongoing feedback to teachers
- Use evaluations to identify and emulate the best teachers

Professional Expertise: investment in training and professional support; deference to educators as experts on quality

Teachers must be prepared in schools of education with training tailored to their job
- Train teachers in relevant subject matter for their content area
- Raise the standards for students enrolled in teacher preparation programs
- Train teachers in relevant classroom experience and pedagogical training
- Make state licensing credentialing and testing a rigorous qualification for becoming a teacher

Teachers build capacity and professional knowledge through collaborative professional development
- Use peer to peer mentoring to improve teacher practice
- Use novice induction programs that prepare support mentor and monitor new teachers
- Use professional learning communities to facilitate teacher collaboration

Teaching is a profession and/or teachers are professionals
- *Involve teachers in developing reforms to teacher policy*
- *Include teachers unions in negotiating the parameters of employment*
- *Maintain tenure system with seniority*
- *Raise teacher pay and/or benefits in order to make teaching a more attractive career*
- *Improve working conditions to make teaching a more attractive career (examples-reduce class size upgrade facilities)*

**Issue areas in italics are also the outcomes of interest)*

Figure A.1.2. *Teacher-based accountability policy preferences, 2001-2014*

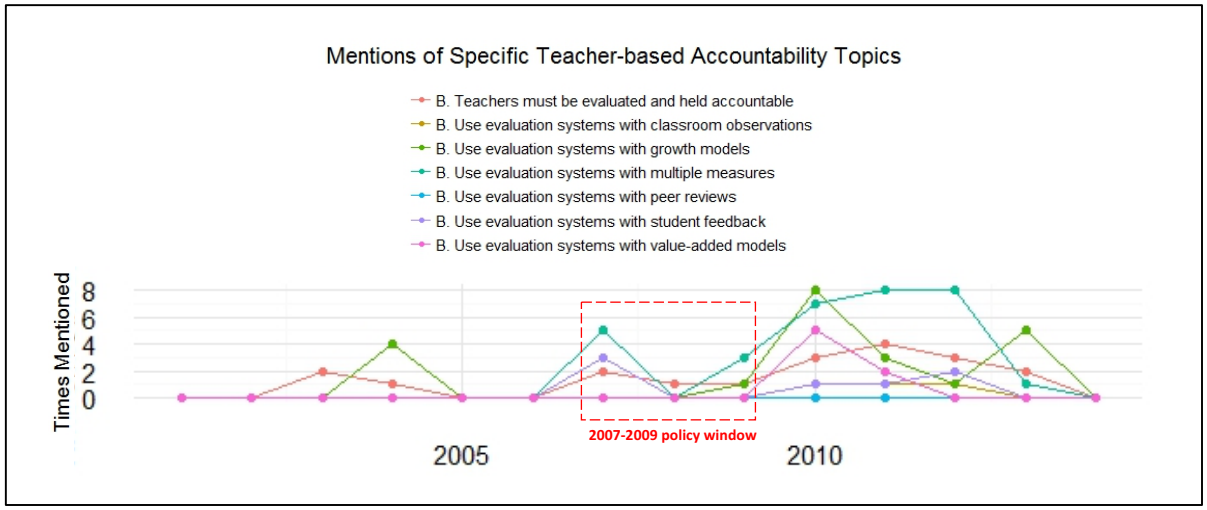

Figure A.1.3. *Teacher professionalism policy preferences, 2001-2014*

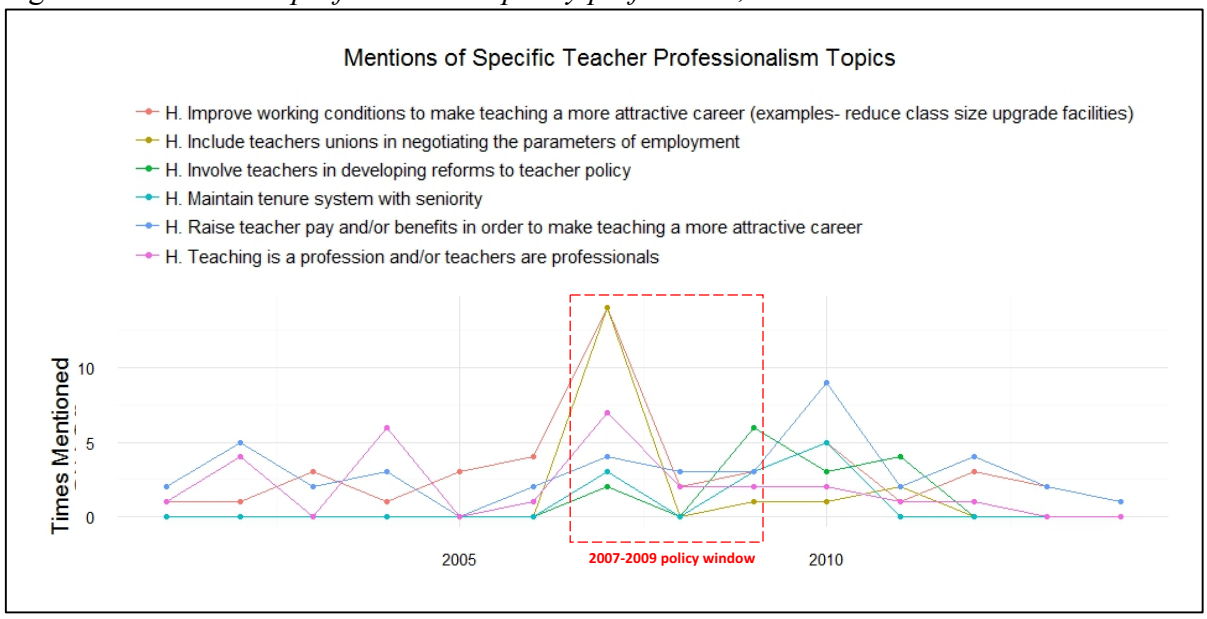

Table A.1.1. *Collinearity for teacher-based accountability policy preferences, 2001-2014*

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Prior support for teacher-based accountability	2.054**	2.025**	1.686*	2.099**	2.037**	2.054**	2.068**	2.050**	1.708*
	(0.360)	(0.877)	(0.941)	(0.897)	(0.874)	(0.872)	(0.875)	(0.872)	(0.965)
Prior support for school-based accountability		0.169							0.146
		(0.623)							(0.802)
Prior support for incentive policies			1.739**						1.748**
			(0.683)						(0.766)
Prior support for teacher preparation accountability				0.796					0.255
				(0.618)					(0.785)
Exposure to efficiency					0.004				-0.003
					(0.009)				(0.012)
Exposure to research						0.002			-0.024
						(0.165)			(0.190)
Exposure to intermediaries							-0.137		-0.298
							(0.433)		(0.659)
Exposure to Gates/Broad								0.035	0.119
								(0.377)	(0.571)
Flag	-0.629	-0.582	-0.164	-0.568	-0.629	-0.629	-0.628	-0.629	-0.095
	(0.722)	(0.743)	(0.765)	(0.721)	(0.722)	(0.721)	(0.723)	(0.721)	(0.808)
Constant	-0.643*	-0.735**	-1.35***	-1.074**	-0.804	-0.647	-0.578	-0.668	-1.329*
	(0.360)	(0.499)	(0.497)	(0.510)	(0.518)	(0.470)	(0.413)	(0.448)	(0.723)
AIC	70.539	72.465	65.705	70.838	72.344	72.538	72.439	72.530	77.111

*Note: *p<0.1; **p<0.05; ***p<0.01*

Table A.1.2. *Collinearity for teacher professionalism policy preferences, 2001-2014*

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Prior support for teacher professionalism	0.951 (0.723)	0.955 (0.728)	0.431 (0.799)	0.702 (0.794)	0.925 (0.759)	0.860 (0.744)	0.974 (0.737)	0.113 (1.037)
Prior support for capacity-building		-0.030 (0.724)						-0.924 (1.009)
Prior support for teacher education			1.336* (0.794)					1.008 (0.975)
exposure to professionalism				0.0125 (0.308)				0.029 (0.026)
exposure to research					0.376* (0.197)			0.515* (0.268)
exposure to intermediary						-1.109 (0.911)		-1.038 (1.017)
exposure to Gates/Broad							-0.615 (0.528)	-1.052 (0.711)
flag	0.316 (0.798)	0.314 (0.799)	0.536 (0.841)	0.308 (0.801)	0.486 (0.832)	0.507 (0.856)	0.405 (0.815)	0.769 (0.949)
intercept	-1.781*** (0.532)	-1.771*** (0.582)	-2.282*** (0.666)	-2.067*** (0.652)	-2.642*** (0.777)	-1.402** (0.572)	-1.429** (0.587)	-2.589*** (1.005)
AIC	58.870	60.868	57.932	60.167	56.87	58.361	59.208	58.196

*Note: *p<0.1; **p<0.05; ***p<0.01*

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ESSAY 2

TIGHT AND LOOSE: HOW INSTRUCTIONAL COACHES MEDIATE THE POLITICS OF EXPERTISE

2.1 Purpose and Objectives

In recent years, instructional coaching has emerged as an important policy lever for districts implementing standards-based reform. Evidence suggests that pressure from high-stakes accountability policies to improve educational performance has accelerated the expansion of instructional coaching in recent years (Domina et al., 2015; Finnegan, Daly, & Liou, 2016). Instructional coaches are typically experienced educators who, either on a part-time or full-time basis, provide ongoing, site-based professional development to teachers (Bean, 2004; Knight, 2007). Research on school organization shows that instructional coaches can support teacher learning and changes in classroom instruction (Camburn, 2010; Coburn, Choi, & Mata, 2010; Coburn & Russell, 2008; Firestone & Martinez, 2007; Mangin, 2009). Instructional coaching may focus on a particular content area (e.g., mathematics, literacy), instructional domain (e.g., technology integration, data-use), or level of schooling (e.g., elementary school, high school). In district policy implementation, coaches often act as boundary-spanners between central office administrators and school faculty, facilitating the interpretation of academic standards, planning and coordinating district reform across schools, and arbitrating between administrators' and teachers' interests (Burch & Spillane, 2004; Swinnerton, 2009).

Mounting evidence indicates that coaches face conflicts when working alongside teachers, supporting and collaborating with them to improve instruction, while also attempting

persuade them to reform their practice according to the goals and desires of school or district leadership (Coburn & Woulfin, 2012; Mangin & Dunsmore, 2015; Obera & Sloan, 2009; Otaiba, Hosp, Smartt, & Dole, 2008). Institutional analysis indicates that the daily experiences of coaches are shaped by a complex interaction of micro- and macro-policy contexts (Woulfin, 2016). Institutional factors, like federal and state reforms, student achievement data, and policy alignment, coalesce within the organizational world in ways that express the discursive power of some policies over others. During policy implementation, coaches act as intermediaries, negotiating power struggles between district officials and teacher colleagues over what to teach and how to teach it. Evidence indicates that the politics of coaching involves the use of social resources, like collegial relationships and informal interactions, in addition to formal authority, to influence teacher instruction in the direction of policy. Implementation studies suggest that social networks, which can facilitate interdependent, collaborative coach-teacher learning processes, are critical for teacher learning related to reform.

This single case study examines the politics of coaching over a 12-month period in one high-achieving school district in Indiana. My study took place throughout the 2015-2016 school year, four years after Indiana adopted a series of education reforms that dramatically intensified the state's accountability system. New teacher evaluation laws, for example, formally linked student growth on the state assessment, the I-STEP, to teacher performance ratings. During the same time period, Indiana adopted new state standards for student learning, which they revised after two years. Conceptually, I draw on idea-based theories of policy change and brokering theory to understand the behavior and attitudes of instructional coaches when faced with conflicting norms for instructional improvement.

I begin with an overview of the political context that shapes teacher learning, namely performance-based accountability and standards-based reform. In recent years, accountability regimes that focus on high-stakes testing have diminished teachers' power over instructional decision-making, often dictating what they teach and how they teach it. In contrast, teacher professionalization focuses on giving teachers control over their working conditions and decision-making autonomy over classroom instruction. Standards-based reform can further entrench high-stakes accountability systems by exerting control over curriculum and instructional decisions. In contrast, standards-based reforms can also catalyze teacher professionalization when teachers play a central role in interpreting standard and shaping local instructional policy. It depends on how these reforms are implemented – a process that instructional coaches increasingly participate in. Instructional coaches are generally framed as local experts in district policy and teaching practice, placing them at the center of conflict over professional expertise. In a policy environment in which policymakers and administrators increasingly mandate particular instructional choices, teacher ownership of professional expertise is called into question. In this study, I examine how instructional coaches navigate tensions over expertise when supporting standards-based policy implementation.

2.2 Literature Review

Instructional coaches engage in the "politics of professionalism" when implementing district reform (Mehta, 2014). Past accounts have framed the politics of coaching as a conflict between policy and practice. When acting as agents of district or school policymakers (i.e., district officials, principals), who hold teachers accountable to specific practices, instructional coaches often challenge the professional autonomy of teachers. Coaches promote reforms aimed

at changing teacher practice according to the goals and desires of school or district leadership while also working alongside teachers to help them improve their instruction (Coburn & Woulfin, 2012; Mangin & Dunsmore, 2015; Obera & Sloan, 2009; Otaiba, Hosp, Smartt, & Dole, 2008). However, as Cochran-Smith and Stern (2015) note, "teacher participation in reform has been constructed primarily as their correct implementation of 'research-based' practices as embodied in mandated curricula and assessments, followed up with close monitoring and surveillance" (p. 196). When coaches act as turnkeys of district reform, they potentially provoke a form of bureaucratic accountability that diminishes teacher professionalism.

On the other hand, evidence also suggests that instructional coaches can professionalize teaching. Characteristics of educators' professionalization include teacher autonomy and discretion, professional responsibility for school quality, and professional capital (Hargreaves, 2007; Mehta, 2015). Professional capital includes teachers' knowledge-based instructional practices, social networks, and decision-making autonomy over classroom instruction (Hargreaves & Fullan, 2012). Past research indicates that the effects of instructional coaching on teacher professional capital at the district level is mediated by how administrators frame instructional coaching support, and how districts shape teacher participation in professional learning and reform (Coburn & Russell, 2008; Mangin & Dunsmore, 2015). Proponents of teacher professionalization stipulate that educational reform is unsustainable without the active participation of teachers (Cochran-Smith & Stern, 2015). At the individual level, coaches' prior relationships with district teachers, the coherence of district policy, and organizational capacity are all factors that influence the level of professionalism, or mutual respect and interdependence, that characterize coach-teacher professional learning relationships.

The professionalization scholarship overlaps with updated notions of policy implementation, which call for new forms of educational improvement, such as improvement science (Bryk et al., 2015), implementation science (Fixsen et al., 2005), and other forms of design-based research (Penuel, Coburn, & Gallagher, 2013). These approaches incorporate teachers as active participants in designing reforms and recognize that local factors, often beyond the control of policymakers, significantly shape policy outcomes. When instructional coaching is school-based and collaborative, and teachers have a voice in shaping district policy, it has the potential to bring teachers together to problem-solve and lead instructional improvement in a similar manner. The ability of coaches to both disenfranchise and empower teachers in matters of instructional decision-making is a paradox of coaching. How might this paradox be characterized in political terms?

2.3 Conceptual Framework

My conceptual framework, which I outline in the next few paragraphs, links macro-level ideologies about teaching and educational improvement occurring at the federal and state levels to micro-level phenomena experienced by coaches at the district level. More specifically, I consider how the instructional coaching has co-evolved with standards-based policy implementation and how instructional coaches address conflict when supporting teachers learning around standards-based reform. This framework builds on this research by couching the conflict experienced by instructional coaches as ideological, as well as institutional, in origin. From this vantage point, instructional coaches mediate the politics of professionalism, filtering and acting on opposing beliefs about educational improvement. Here, I focus on the political dimensions of expertise use.

2.3.1. The Politics of Professional Expertise

Federal and state mandates have shifted school district agendas in the direction of accountability by, for example, mandating that states establish annual testing, academic standards, and teacher evaluation systems linked to student achievement growth. Standards-based improvement is a central component of accountability reforms. In this model, policymakers adopt academic standards that define the content and processes that students should learn by grade level and subject area. Assessments aligned to those standards then determine how well students have mastered content. The expansion of accountability and standards-based improvement has reshaped some aspects of district instructional policy. No Child Left Behind (NCLB), for example, began a trend of increasing demands for using research evidence to shape school reform and data-driven decision-making (Honig & Coburn, 2008). Consequently, many districts have adopted "evidence-based" or "research-based" curricular programs to improve student learning. More recently, Race To The Top (RTTT) intensified standards-based accountability regimes by accelerating the widespread adoption of the Common Core State Standards (CCSS) and statewide teacher evaluation systems. In response to shifting policy demands, many districts have enacted curricular programs and data systems to support standards-based policy implementation and improve student achievement. While the implementation of "first-generation" accountability systems often lacked mechanisms to support teacher learning, recent trends indicate contemporary iterations place more emphasis on this kind of capacity-building (Mintrop & Trujillo, 2005). In many cases, for example, districts have enacted instructional coaching to support teacher learning for standards-based reforms (Neufeld & Roper, 2003).

As street-level bureaucrats (Lipsky, 1983), instructional coaches help shape standards-based education policy as they work with teachers to develop classroom practices that align with standards (Coburn & Woulfin, 2012). In one nation-wide study of instructional coaching trends, interviews with coaches indicated their role is closely linked to the implementation of academic standards, particularly the new CCSS. Typically, coaches first developed expertise in the standards through targeted professional development opportunities and by establishing extensive professional networks (Domina et al., 2015). Educators need to time to interpret standards and experiment with new teaching practices – a process called "sense-making" (Coburn, 2001). Research shows coaches can facilitate the sense-making process and improve teachers' ability to access content expertise (Coburn, Choi. & Mata, 2010). Thus, coaches possessed a particular type of instructional expertise aimed at facilitating the interpretation of academic standards into classroom practice.

At the same time, a number of studies suggest such support from instructional coaches can lead to conflict that undermines teacher learning. Standards-based policies, in particular, put coaches in a balancing act between prescriptive curricula, which often dictates not only what to teach but how to teach it, and teacher autonomy. Coaches are frequently tasked with implementing programs that challenge teachers' expertise and experience, their pedagogical beliefs, and their existing practices (Obera & Sloan, 2009). Overall, the authority on instructional expertise, or "who is the expert," are central ideological tenets on both sides of an ongoing debates over who controls the implementation of standards-based reforms. Table 2.1 provides a general overview of this framework. Notably, Figure 1 is designed for conceptual purposes; the two sides of the accountability debate are not always clearly distinguished from each other.

Table 2.1. *Accountability and professionalism ideas, policies, and coaching roles*

	Accountability	**Professionalism**
Macro-level ideas	• Hold schools and teachers accountable • Educators respond to incentives	• Teachers are professionals • Teachers require professional autonomy
District policies	• Adopt evidence-based curriculum • Develop student data infrastructure • Principals observe/evaluate teachers	• Provide opportunities for teacher collaboration • Teacher-led decision-making for instructional policy
Roles of coaches	• Support data use for instructional improvement • Monitor program fidelity • Align curriculum to standards	• Facilitate teacher discussion and peer mentoring • Include teachers in curricular planning

On one side, test-based accountability systems place emphasis on standardization, data-use, and technical efficiency. Advocates of standard-based reforms argue that teachers' work should be guided by common standards, similar to other fields, which can improve practice (Ravitch, 1995). Unlike other professions, teaching does not have an explicit technical core of knowledge and is more dependent on individual experience as the primary source of knowledge (Lortie, 1975; Mehta, 2013). Standards-based policies attempt to specify professional expertise by articulating the content of teachers' instruction. This approach is based on the idea that teachers' instruction is an important determinant of student learning – a claim verified by research studies (Carbonaro, 2005; Gamoran et al., 1997; Schmidt et al., 2001). Meanwhile, numerous empirical analyses have linked standards-based accountability to improvements in student performance (Carnoy & Loeb, 2002; Dee & Jacob, 2009; Hanushek & Raymond, 2005). One common feature of standards-based approaches is the systematic collection and analysis of student data, which can guide decisions to help improve teaching and learning (Marsh, Pane, & Hamilton, 2006). Studies have linked effective data use to improved student learning, greater

collaboration among teachers, and better identification of students' learning needs (Chen, Heritage, & Lee, 2005; Feldman & Tung, 2001; Wayman & Stringfield, 2006)

On the other side, critics of accountability warn that prescriptive curriculum and administrative scrutiny detract from the intrinsic rewards of teaching and constrain teachers' ability to respond to the unpredictable classroom environment and diminish authentic learning experiences (McNeil, 2000; Thiessen, 2000). Others worry that standards-based reforms diminish teachers' professional confidence as instructional experts and weaken their ability to make important instructional decisions (Helsby & McCulloch, 2000). Research shows that teachers, like skilled experts in other domains, synthesize different types of knowledge, such as content, pedagogical, and student-specific knowledge, to make hundreds of complex decisions on any given day (Darling-Hammond & Bransford, 2005). Thus, rather than converging around uniformity and compliance, advocates of teacher professionalization argue that teaching should move towards professional norms that dominate other fields such as law and medicine. This approach involves building capacity for peer mentorship, entails the use of practical expertise, and devolves authority over instructional choices to teachers. From this point of view, teachers are active participants in standards-based reform with significant agency in terms of how standards are interpreted and implemented.

Overall, instructional coaches may facilitate knowledge sharing and sense-making, but they may also act as turnkeys for administrators and enhance the top-down, compliance-oriented downsides of standards-based reform. In reality, the role of instructional coaches in reform, standards-based and otherwise, is still evolving and varies widely across state and district contexts (Deussen, Coskie, Robinson, & Autio, 2007; Woulfin & Rigby, 2017). The district examined in this study implemented standards-based reforms supported by a strong model of

systemic coaching, making it an optimal site to examine how coaches use expertise to shape teacher instruction. Systems-level approaches orchestrate change from the district level across schools, rather than focusing on school-level improvement. As key intermediaries between district and school personal, instructional coaches can promote systemic district reform that facilitates professional learning around standards-based reform and builds organizational capacity that goes beyond teacher development. The main intent of this research is to elaborate on existing knowledge of instructional coaching politics by conceptualizing how expertise interacts with power struggles over instructional decision-making. Departing from this analytical viewpoint, I focused on answering the following three research questions:

1. What kinds of expertise do coaches use to support standards-based policy implementation and how do they use it?
2. How do instructional coaches negotiate between the demands of districts and deferring expertise to teachers?
3. What factors affect variations in how coaches use expertise?

2.4 Methods

This is single qualitative case study of one instructional coach team from a high-performing district in Indiana. While case studies are not generalizable, my observations enabled me to identify and begin to theorize about some of the relationships between expertise, standards-based policy implementation, and instructional coaching (Yin, 2014).

2.4.1. Policy Context

Indiana was an appropriate state to study instructional coaches in the context of standards-based accountability. In Indiana, the performance ratings of both schools and teachers

included a measure of their ability to raise standardized test scores. Each school received a letter grade based on the state assessment, a NCLB-era "school report card" policy. School report cards are frequently used by parents, the media and politicians to make judgments about the educational quality of teachers, schools, and districts (Jacobsen, Snyder, & Saultz, 2014). Teacher evaluation laws in Indiana, meanwhile, required districts to create performance ratings for teachers, which had to include some form of student test score growth. Based on their ratings, teachers were assigned to one of four categories (highly effective, effective, in need of improvement, and ineffective), which affected a teacher's pay raise and job security. Consequently, districts in Indiana were under intense pressure to raise student scores on the I-STEP, Indiana's state assessment. Despite the high stakes involved, the I-STEP changed frequently because of a prolonged battle in the state over standardized testing policy. This effectively created a blind target for teachers and administrators: the content, administration and format of the assessment changed every few years.

This study examines one Indiana district's decision to hire instructional coaches in response to increasing accountability pressures. District studies of standards-based reform implementation can yield critical insights into the potential consequences of "next-generation" accountability systems, which include more on-site, embedded professional support systems for teachers (Center for American Progress, 2014). In the case of instructional coaching, the power dynamics involved in asserting expertise for teaching provide a valuable context for analysis. As Domina et al. (2015) note, coaches are "professional sense-makers" for standards-based reform, helping educators understand standards, reflect on practice, and use instructional methods that align with standards. If current trends continue, instructional coaching will continue to gain popularity as a district-level support system for teacher professional learning. Thus, district

instructional coaches were a rich data source for furthering our understanding of how standards-based reforms shape instructional expertise and policy implementation processes.

2.4.2. District Sample

I purposively sampled one school district in order to closely analyze instructional coaches as they implemented standards-based district instructional policy. My study took place during the 2015-16 academic year, three years after the enactment of Indiana's teacher evaluation reforms. The Batali School District (i.e., "Batali"), located in Indiana, is a medium-sized suburban school district with exceptional student test scores.[3] The district serves approximately 9,500 mostly non-Latino white students, of whom roughly 20% are eligible for free or reduced-price lunch, in six elementary schools (~4,000 students), two middle schools (~2,100 students) and one high school (~2,400 students). My study focused on Batali's six elementary school instructional coaches. Batali was selected from a larger study of teacher social networks and classroom practice in eight Midwestern school districts for three reasons. First, Batali had instructional coaches in every elementary school building (grades K-5) in the district. Coaching was a central part of the district's professional development system and the coaches worked extensively with teachers in their buildings, as well as with administrators to plan and implement instructional policy.

Second, the district had attracted attention across Indiana for its growth in student achievement. Test scores on the state assessment (i.e., the I-STEP) in both mathematics and reading had improved consistently in Batali from 2009-10 to 2014-15. The district leaders attributed their success to a curricular implementation model that focused on coaching. Third, the district's instructional policy had strong teacher leadership components and a mandated

[3] This is a pseudonym. All names of people and places have been assigned pseudonyms to protect the anonymity of research participants.

curriculum in mathematics and literacy. These elements provided a perfect opportunity to observe systemic conflict. Instructional coaches in Batali had to manage conflicts inherent in district instructional policy implementation. Altogether, Batali was an ideal site to observe an established coaching team supporting district-wide changes in instruction and growth in student achievement.

2.4.3. Instructional Coach Sample

I collected and analyzed data on Batali's instructional coaching team over a 9-month period during the 2015-16 school year. My primary source of qualitative data included 24 semi-structured interviews with instructional coaches (n=18) and district administrators (n=6) and observations of 20 hours of coach team meetings. I collected data at two time points, once before and once after Indiana's testing window, which starts at the beginning of March and extends until the end of April. This enabled me to examine the coaches' attitudes and behaviors before and after students took state assessments. All six members of the coaching team were invited to participate in the study and all six consented. The inclusion of all the coaches was important for examining the coaches as a team. I paid particular attention to group vis-à-vis individual reform activities to distinguish team processes from others coaching behaviors. At first glance, the team appears to be a relatively homogenous group. This was true in terms of education, gender and race - all of the coaches were well-educated White females. In other areas, particularly in terms of their professional backgrounds, however, the coaches represented a diversity of experiences. Table 2.2 provides additional information about the coach sample.

Table 2.2. *Batali instructional coach sample*

Coach	Age, Race, gender	Teaching Experience	Coaching Experience	Career Stage	Professional Background
Josie	25-35yrs White, female,	1yr	4yrs	Novice	-Interventionist experience -Administrative training
Ruby	25-35yrs White, female	6yrs	< 1 yr	Novice	-New coach to district -Administrative training
Anne	30-40yrs White, female	12yrs	3yrs	Mid-career	--Former teacher leader -Reading specialist
Shirley	35-45yrs White, female	16yrs	2yrs	Mid-career	-Interventionist experience -Media specialist
Diana	45-55yrs White, female	30yrs	6yrs	Veteran	-Former teacher leader -Only original coach remaining
Mary	45-55 White, female	30yrs	5yrs	Veteran	-Former teacher leader -Reading specialist

2.4.4. Analysis

To analyze how coaches used expertise to influence policy implementation, I drew on qualitative traditions in the political sciences. Political science theory focuses on questions of power and conflict, among other things, in order to understand specific policies or governance structures (Blum & Schubert, 2011). The micro-analytical perspective attempts to elucidate macro- and meso-level political processes by using discoveries at the micro level. By definition, this branch of scholarship focuses on the beliefs and behaviors of actors, which, in turn, shed light on the underlying social and organizational forces that feed back into the political system. My approach focused on operationalizing the macro-level paradigm shift towards accountability in terms of a micro-level phenomenon. I also drew sparingly on survey data from a wider study on instructional coaching to triangulate and validate my qualitative findings.

To characterize shifting ideological norms around reform, I supplemented my main data analysis with additional evidence from written artifacts, timelines, district plans, state policy documents, curricular program supports, and coach-created professional development resources. Overall, I collected 87 policy documents. To better understand organizational shifts, I asked questions about how actors' roles and behaviors were impacted by the implementation of accountability policies. Data collection focused on a number of *a priori* factors aggregated from prior research on instructional coaching and district policy implementation that influence coaching behavior and beliefs. These factors included school context, local social networks, administrative support, district expectations for improvement, organizational supports, leadership arrangements, prior reform experience, opportunities to collaborate, and available support staff. I analyzed how new organizational structures were created or modified to facilitate standards-based reform implementation.

The bulk of my findings focus on institutional change, which was expressed by the adoption of formal support systems, including instructional coaching, and informal norms about educator improvement. The instructional support system characterized Batali's recent institutional transformation in response to accountability reforms. A useful way to gauge the impact of external political pressure and shifting institutional norms is to see how it affects what Wilson (1989) calls the "critical tasks" of public administrators. Wilson characterizes critical tasks as the activities performed by an organization's frontline employees each day to address problems as they arise. By examining critical tasks, Wilson (1989) argues one can uncover not only "what government agencies do" but also "why they do it." How coaches interpreted and carried out critical tasks was significant because those actions gave meaning to shifting policy pressures and norms about teacher development and educational improvement. Examining

critical tasks also revealed important district organizational and social structures that supported, or hindered, district policy implementation.

Overall, I coded 64 unique critical tasks, which occurred at varying frequencies. I recorded the number of times that coaches discussed critical tasks in interviews and instances of observed critical tasks during coach meetings. I looked for variations within each task to sensitize my codes and enrich the comparative power of my data. For each critical task, information was obtained about the amount or frequency, the rationale for the task, the actors involved, and any conflict or problem-solving experienced. I found critical tasks fell into three broad categories: curricular resource development, data and assessments, and professional learning. First, the coaches developed a staggering amount of curricular resources on a weekly basis. For example, instructional coaches reviewed meeting agendas and formative assessment data on Mondays to provide targeted support for grade-level PLCs on Wednesdays. In one instance, one of the instructional coaches noticed a drop in third-grade writing scores across the district. She responded by creating a new writing prompt, which addressed the specific skill – identifying the main idea – that she distributed to both her building's third-grade team and content leaders in the other schools. Second, the coaches lead professional development for data and assessments and helped maintain a sophisticated data system, which included any form of student testing. For example, teachers did not have any responsibilities for benchmark testing students that were below proficiency. This task was absorbed entirely by the coach team. Third, the coaches facilitated professional learning either directly through formal professional development or informally by building teacher relationships.

2.5. Findings

My findings indicate Batali's instructional coach team was a critical source of expertise for standards-based reform implementation. This section summarizes my findings.

2.5.1. Developing Implementation Expertise for Standards-Based Improvement

The instructional coaches in Batali developed expertise in implementing standards-based instructional policy, or "implementation expertise." Implementation expertise was a combination of formal and informal knowledge aimed at district-wide policy implementation, which differed in scope from implementing policies in a single school or classroom. For example, the instructional coaches organized professional development for teachers in multiple schools and planned curriculum at the district level. The district's instructional system, which the coaches helped develop and maintain, included the core elements of standards-based improvement: standards and assessments (Briars & Resnick, 2000). Batali adopted curriculum that aligned with Indiana's content and performance standards in both literacy and mathematics across all its elementary school grades. Assessments aligned to those standards, meanwhile, were used to evaluate student mastery of content, and to facilitate data-use for improving classroom practice. Collectively, the coaches provided district-wide expertise in interpreting the Indiana state standards, which was important for improving curriculum in the direction of state policy and aligning instruction with the I-STEP.

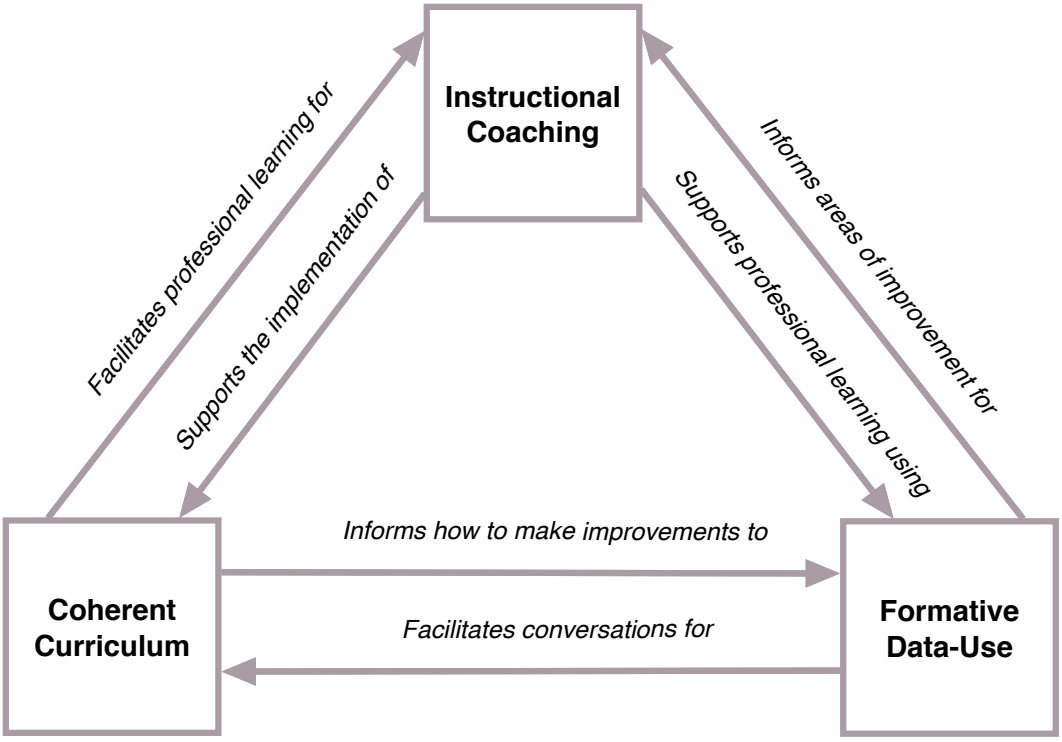
The instructional coaches were responsible for connecting the standards to the curriculum and supporting teachers' enactment of that curriculum. This was a multifaceted process that, among other things, involved synthesizing information and coordinating resources across Batali's six elementary schools, collective lesson planning and assessment writing at the district level, and analyzing district-wide data. The instructional coaches regularly collaborated to

interpret academic standards and link them to district curriculum. They also used formative assessment data to target areas for improvement and inform discussions about policy implementation. The development of implementation expertise, which was defined by these kinds of tasks, was determined by how district officials framed the instructional coach role in district-wide instructional policy.

2.5.2. Role in Policy Implementation

The district's instructional policy, called "The Batali Way," aimed to raising student achievement by using collaborative, data-driven decision-making supported by targeted and ongoing professional development (see Figure 2.1).

Figure 2.1. *Diagram of "The Batali Way"*



In interviews, the district administrators described The Batali Way as a "systemic reform" with three interdependent parts: a coherent curriculum, data-driven improvement, and instructional coaching. Importantly, there was a strong belief amongst the administrators that each component was essential for instructional improvement. "They are like the legs of a three-legged stool," explained one district official. "If you take one away, the whole thing falls down." District officials viewed coherent curriculum coupled with data-use as a necessity for instructional coaches to facilitate teacher conversations around instructional improvement. Thus, the instructional coaches were explicitly framed as part of a district-wide instructional improvement system. This was important for understanding how the instructional coaches developed expertise. There were differences between the individual coaches, but they understood their group role as providing professional support in curriculum and data use.

Similar to Identical Instruction: In terms of curriculum, instructional coaches were a mechanism for maintaining fidelity to district programs, as well as a support system for teachers and administrators. The Batali Way mandated "similar to identical" instruction, which according to one coach meant, "I could go into any classroom, on any day and teachers in the same grade level should be teaching the same lesson at the same time." Teachers had to follow detailed curriculum maps and teach the district's core curricular programs with fidelity in mathematics and literacy. Instructional coaching in Batali began as a support system for the implementation of *Everyday Mathematics* (EDM), an evidence-based curricular program. According to one of the district administrators, "Everyday Math is a very different math program from a traditional math program. In order for you to get results, you have to do the program with fidelity." After a pilot year with EDM in 2011, instructional coaching was expanded to support the implementation of the literacy curriculum, Reading Street and 6+1 Writing. Curriculum mapping for EDM provided

groundwork for district norms around collective lesson planning. Although teachers had more flexibility for planning literacy lessons, they were still expected to teach topics at the same time, use the same curricular resources, and employ similar pedagogical techniques. Thus, rather than individual teachers planning daily lessons, Batali had a centralized curriculum planning structure led by the instructional coach team.

Consequently, the instructional coaches developed considerable expertise in implementing the core curriculum – not only how to teach it, but also how to help teachers improve their practice. This was a complex process that revealed a particular type of expertise that involved tasks such as interpreting state standards, aligning curriculum, designing professional development, coordinating resources across multiple buildings, and bridging the gap between district expectations and teacher practice – to name a few. Grade-level specialization was a critical part of this process. Each coach specialized in a specific grade level, which maximized the ability of the coaches, as a team, to develop expertise across the curriculum. As on coach explained, "We each take a grade level now and we can focus in on the grade level and be good at it, and then share the stuff with everybody because we trust each other that way, that it's all going to be good stuff and all the same." Grade-level specialization extended to leadership positions on district-wide grade-level committees of teacher leaders that represented Professional Learning Communities (PLCs) from every school. Grade-level committees were responsible for making adaptations to the curriculum. The instructional coaches also worked closely with grade-level leaders in their building, often communicating daily and co-planning professional development.

Data-driven improvement: Data-drive improvement was another important component of Batali's instructional support system. At the district level, the instructional coaches played a

central role in developing the assessments and the district's improvement system, called "Learning Labs." Learning Labs were designed to implement Indiana's Response to Intervention (RTI) policy, which required districts to create intervention programs for students performing below proficiency in mathematics and reading. Students below proficiency were sent to Learning Labs during social studies and science lessons to receive extra support in literacy and mathematics, respectively. The instructional coach team was responsible for developing, planning, and supervising Learning Labs lessons. The coaches were supported by Matt Rogers, the district's Data Director. Matt created "teacher-friendly" score reports that enabled student sorting into Learning Labs and helped teachers identify areas in need of improvement. "It's so nice," explained one coach, "I don't need to sort through a bunch of data, it's all here in one place." Thus, the Learning Labs coupled with the district's data infrastructure provided the instructional coaches with a system-wide understanding of student achievement.

The labs were implemented by para-professionals, called "Learning Lab Ladies," managed by an instructional coach. The coaches trained Learning Lab Ladies to teach intervention lessons and often co-taught with them. Intervention planning and teaching reinforced collaborative, system-wide planning and gave the coaches an opportunity to learn and discuss impeding changes and anticipate implementation challenges. For example, the coaches dedicated three full days to adapting all of the district's Learning Lab lessons for the new iteration of EDM. Next, the coaches identified a lesson to experiment with, which they all implemented during the week and discussed during their next meeting. Importantly, the Learning Labs were aligned to the rest of the curriculum and were instrumental in improving core lessons as well as intervention lessons.

In sum, implementation expertise was closely connected to the district's curricular programs and data-driven improvement. The instructional coaches acquired important systems-level skills in collaborative planning, as well as managing and analyzing data for district-wide achievement growth. The nature of implementation expertise was fluid and process-oriented; it was less about knowing explicit information and more about knowing how to use different types of resources. Knowledge was a particularly salient resource. While there were many types of knowledge, ranging from knowledge of programs to knowledge of which teachers were the most creative, there were two broad categories. The first category, policy knowledge, centered around Batali's curricular programs and how district administrators wanted them to be implemented. The instructional coaches had special access to policy knowledge, giving them special status as arbiters of district reform. The second category, teacher knowledge, was embedded in teacher social networks and referred to practitioner know how for implementing district instructional programs. Knowing when and how to access policy knowledge and teacher knowledge was fundamental for developing implementation expertise.

2.5.3. The Locus of Expertise

In situations that involved making instructional choices about what to teach and how to teach it, the coaches vacillated between "being the expert" and deferring expertise to teachers. The instructional coaches had to balance administrative policy priorities and the professional autonomy of teachers. To articulate this phenomenon, I draw on the psychological term "locus of control" described by Rotter (1954). Locus of control refers to how much individuals believe they can control the events around them. In this case, the events in question were instructional choices (e.g., lesson format, teaching approach, student grouping, etc.) and who had authority over them. Policy knowledge and teacher knowledge interacted with the locus of expertise in

significant ways. In general, the coaches had more control over the locus of expertise when using policy knowledge. For example, the coaches used policy knowledge to create district-wide professional development workshops, which often included pre-made lesson plans and class activities. In contrast, teachers had more control over the locus of expertise when teacher knowledge was prominent. Teacher knowledge, for example, was important for coaching sessions, which involved helping teachers reflect on their practice and co-planning lessons.

In general, the resources and assessments created by the coaches aligned with the district's core curricula, which could further diminish teachers' control over classroom instruction. Curricular resources, such as exemplar lesson plans, workstation ideas, and graphic organizers were not value-free. They frequently apprehended autonomy over instructional choices and elevated the importance of program fidelity, which in practical terms meant doing what all the other teachers were doing. This pattern of conformity was amplified by effective communication networks, which ensured that resources were disseminated quickly and broadly. For example, when the instructional coaches reformed the writing curriculum, teachers added a curriculum calendar for writing to their lesson planning regime. At the same time, the coaches also used data and the development of resources to incorporate teacher ideas and innovations into reform. This had the effect of diversifying the instructional choices and ceded ownership over resources back to teachers. For example, the coaching team facilitated the exchange of best practices between schools and used data to identify teachers to emulate.

Tight and Loose: The coaches and administrators often used the phrase "tight and loose" to define the locus of expertise or how much control teachers had over a particular instructional choice. The Batali Way engendered a highly centralized decision-making structure in terms of the curriculum, giving coaches' "tight" control over teachers' instructional choices. Teachers

had greater discretion over instructional approaches, which was the "loose" part of policy implementation. The coaches' access to district administrators also gave them policy-oriented authority, but it was not supervisory - they did not evaluate teachers. Rather, the coaches knew "what the district wanted," and were viewed by staff as the main building authority in terms of policy knowledge. As Ruby, a coach, described the benefits of regular interactions with Liz Grayson, the assistant superintendent that managed the coach team:

> "We know the expectations...where it is ok to be really loose and where Liz expects it to be really tight. I think it impacts teachers so much. We have a guide of what we can and cannot do. She kind of gives us that permission."

Overall, policy knowledge was a combination of curricular program knowledge, knowledge of state academic standards, and knowledge of district policy expectations.

Teacher knowledge was another important source of implementation expertise. Teachers had practical knowledge, or "know how," for improving practices. Although the coaches often experimented with new lessons and reflected on their practice, teachers offered a diversity of perspectives. Each teacher had a unique experience when implementing new policies that might uncover new challenges, innovative solutions to common problems, or improvements that coaches had not thought of previously. Thus, teacher knowledge was vital for policy implementation and coaches relied on collaboration with teachers to understand how reforms impacted instruction, which parts of a new program teachers needed extra help with, and ideas for integrating program changes into existing practice. "I might be a coach," commented one coach, "but I learn from teachers all the time. We get to go to PDs and work together to come up with ideas, but we especially rely on our veteran teachers…[T]hey have great techniques that I see and when I'm with my new teachers I teach them those techniques." Teacher knowledge was

socially embedded and required interactions with teachers, which was related to the coaches' professional backgrounds in Batali and elsewhere.

There were two important venues for mediating policy knowledge and teacher knowledge: grade-level committees and instructional coach meetings. Grade-level committees, which included teacher leaders from each building, were responsible for made "small tweaks," or adaptations to teaching resources, lesson plans and curriculum maps. The committees were an important way for teachers to exert influence on the curriculum. Teacher leaders could carry messages to the coaches and compare experiences with other buildings to identify instructional issues. "They tell us what's working and what isn't…and if there are four or five buildings with the same problem, we know it's something we should tweak," said one coach. The other five coaches made similar comments about the grade-level committees. While the teacher leaders offered teacher knowledge for specific grade levels, the instructional coaches used policy knowledge of the broader curriculum, to shape this process. "I see the coaches for the grades above and below me, so I know what's coming and where they are coming from," explained one coach.

The instructional coaches also all reported working closely with grade-level leaders in their building, often communicating daily and co-planning professional development. A comparison of the coaches' schedules, which they were asked about in interviews, also showed they interacted with their building principals and numerous teachers every week. Regular interactions with educators in their building was a vital source of teacher knowledge, which they integrated incrementally into broader district policy during weekly instructional coach meetings on Fridays. Friday coach meetings were an opportunity to "compare notes" and systemically improve teacher practice. For example, during a series of meetings, the coaches revised Learning

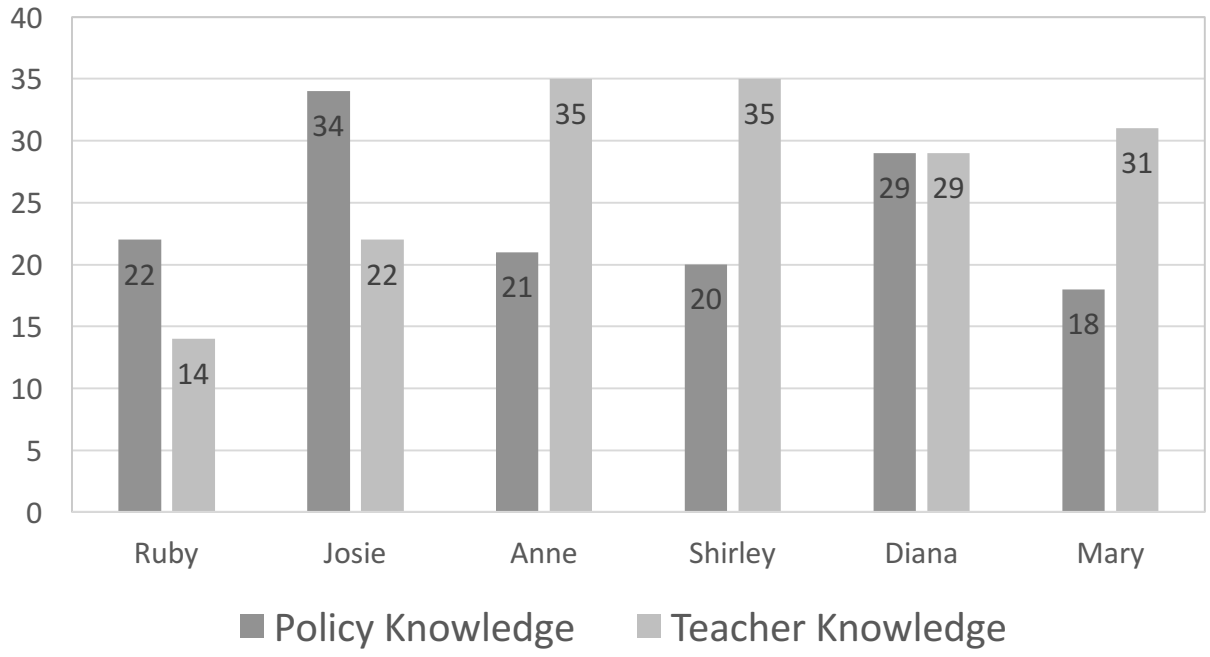
Lab lesson plans for a new iteration of EDM. The coaches drew on past lessons from observing teacher practice and discussions with teachers. When discussing a lesson on decimals, for example, the coaches noted that EDM did not provide enough independent practice for students. Moreover, teachers from four of the six buildings had mentioned the lesson "felt rushed," which lead the coaches to create a two-day lesson plan instead of the one outlined by the curriculum. The coaches also saw this as an opportunity to more explicitly align the lesson to the state standards, which called for students to be able to compare decimals and fractions. Thus, the coaches used multiple sources of teacher and policy knowledge to improve the Learning Lab lesson. They also noted that the grade-level committee should change the lesson for the following year.

2.5.4. Factors that Affected Expertise Use

Several factors affected how the coaches used expertise to influence teacher practice including their professional background, program fidelity, and the district's organizational climate.

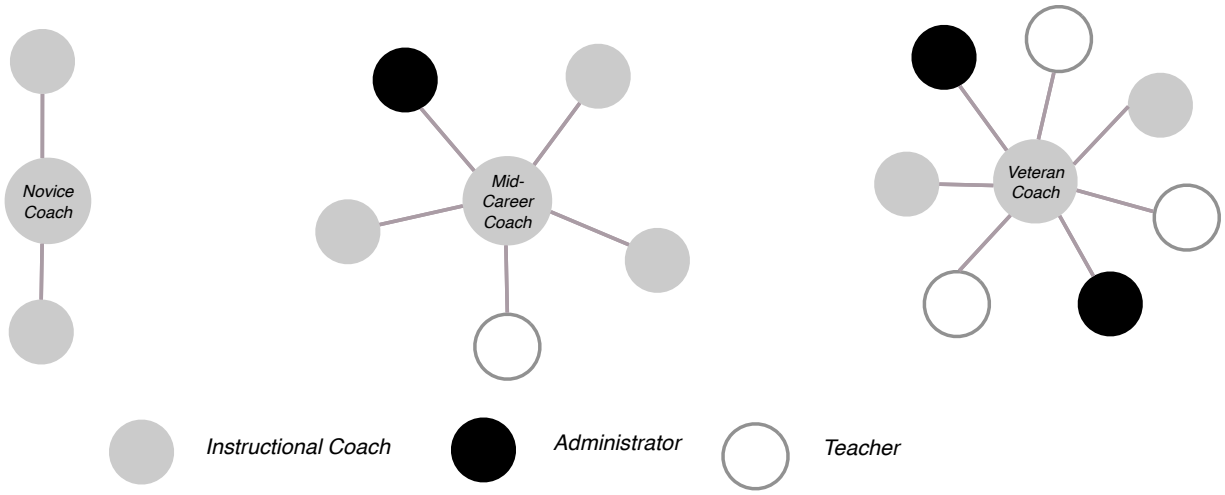
Coach Professional Background: There was a strong relationship between the coaches' years of professional experience and their tendency to rely on policy knowledge to guide instructional support (see Figure 2.2).

Figure 2.2. *Coaches' use of implementation expertise: policy vs. teacher knowledge*



The two newer coaches who were hired from outside Batali, Ruby and Josie, tended to rely more on their policy knowledge to influence instruction. This seemed, in part, to be a consequence of having fewer existing social ties with teacher colleagues. Figure 2.3 illustrates representative network motifs of instructional coaches based on their years of teaching experience. Figure 2.3 highlights differences in the distribution of administrator and teacher relationships of one of the novice coaches (0-9 years), a mid-career coach (10-19 years in education), and an experienced coach (more than 20 years in education). Knowledge of teachers' social networks helped coaches to access teacher expertise. Coaches accessed and shared teacher expertise in a variety of ways by, for example, conversing with teachers during PLC meetings, sharing teacher innovations across the district daily via email, and using written feedback before and after PD.

Figure 2.3. *Social network motifs based on career stages*



Ruby and Josie, the two new coaches, did not have many close colleagues from working in the district and relied on strong management and administrative skills to build trust with teachers. Neither coach nominated teachers as colleagues that they approached to discuss instructional improvement. Both Ruby and Josie were identified as "real go-getters" and "high flyers" indicating than younger or less experienced coaches can offset a limited teaching experience with other kinds of experiences and management skills. Both, for example, had worked in contexts outside of Batali and both had advanced degrees in administration. Ruby, meanwhile, was new to coaching and had not yet developed many close relationships with teacher colleagues. Josie had contributed a number of system-wide innovations, which gave her social status that seemed to overshadow her lack of teaching experience. Still, despite having worked in her building for more than three years, Josie did not access teacher knowledge as frequently as policy knowledge for coaching activities. She reported having good relationships with her teachers, but this did not extend to advice about instructional improvement. Josie's network was more administrator-oriented in comparison to Mary, who had also been a coach in

her building for three years. Mary nominated a majority of teachers and few administrators or coaches.

Other coaches relied more on social influence through informal interactions to shape teacher instruction and were more hesitant to impose instructional changes directly. This was common with the mid-career coaches, Anna and Shirley, who both relied more on teacher knowledge to influence instruction. Both wanted the teachers in their building to see them as equals and downplayed their policy knowledge. Instead, they focused more on facilitating the exchange of teacher knowledge and finding indirect ways to influence teacher practice, such as suggesting a new strategy at a PLC meeting or co-planning with teachers. As one mid-career coach explained, "I think we're really good about playing into those people and pulling out what they do[…]I'm not the expert. I just try to facilitate all the good ideas. That's how I look at it." Mary, one of the veteran coaches also had a strong tendency to use teacher knowledge, but for different reasons. Mary wanted teacher interests represented at the district level and was purposeful about bringing teacher suggestions to coach team meetings and voiced the teacher point of view more often than the rest of the instructional coaches in team meetings. The other veteran coach, Diana, focused equally on policy knowledge and teacher knowledge, which was reflected by a diverse social network. Overall, the mix of ages and experiences, as well as variations in the use of expertise, encouraged examining problems from multiple perspectives, and improved knowledge building.

Program Fidelity: Prescriptive curricular programs placed the locus of expertise with the coaching team. One of the more bureaucratic aspects of Batali's instructional program were curriculum calendars. The coaches focused almost exclusively on supporting the three core curricular programs, which one coach described as "non-negotiables." Loose coupling still

existed on some matters of pedagogy - less so in mathematics than reading and writing - but the scope and sequence of the curriculum was directed from Batali's central office. Much more detailed than traditional curriculum maps, the calendars laid out weekly lesson plans for every teacher. Teachers had discretion over how to teach lessons, but not the lesson content or the order in which it was taught. In some cases, how to teach a particular concept was also mandated. As evidenced by the maps and coach interviews, the Everyday Mathematics (EDM) curriculum was more prescriptive than Reading Street or 6+1 Writing. The way EDM is designed leaves little room for teacher interpretation.

Consequently, less coaching was concentrated on math with the exception of new teachers. In their interviews, five of the six coaches reported they focused more on writing and reading than math. When asked why, one coach responded, "[W]ith my newer teachers I do get to go in and model lessons for math, and work with math stations as well, but some of our older teachers who have been doing Everyday Math here have got it down pat." New teachers had to "learn the procedures" and "how to teach" EDM, but otherwise the instructional coaches did not spend much time supporting mathematics. In contrast, coaching in reading and writing was more intensive and less directed. This applied not only to teacher interactions, but to coach interactions as well. Teachers had much more instructional decision-making power in literacy and, therefore, they were able to reflect on with their coaches more frequently. While coaches frequently shared teacher innovations in literacy, they did so less for mathematics. In literacy, teachers were more likely to share new ideas with colleagues, resulting in the use of more teacher expertise in literacy. Thus, one potential drawback of focusing less on EDM was the lack of teacher innovation in mathematics in comparison to literacy.

Despite the consequences for teacher autonomy, the coaches and the administrators strongly believed in the effectiveness of the EDM curriculum to improve student learning in math. When discussing their first year of implementation, one coach, Liz, recalled, "Typically, when you implement a new program such as Everyday Math, you're going to see an implementation dip in your (I-STEP) scores. We did not. Every year since we started Everyday Math and every year that we had instructional coaches, our scores have gone up in math and language arts." In Batali's experience if you taught the curriculum with fidelity, student gains would follow. In interviews, all but one of the coaches linked EDM to improved student achievement. Two of the coaches also talked about their success with EDM in terms of regional status. A number of administrators, instructional coaches, and teachers had visited from other districts to observe Batali's EDM curriculum because of notable improvements in student test scores.

Organizational Culture of Sharing: Overall, the instructional coaches were responsible for developing and maintaining an organizational system that could respond to unpredictable state and federal accountability policies. To further support standards-based improvement and support student achievement growth, the coaches also conducted research on the I-STEP and created professional development specific prior to testing to improve test scores. The district reaped the benefits of an organizational system that focused on improving assessment scores and sharing curricular resources. By mandating lock-step curriculum implementation, the coaches could anticipate and plan critical learning opportunities. The common instructional language, created by strict adherence to the district's core programs, facilitated the exchange of ideas, resource sharing and professional learning. The common terms and strategies enabled this communication, accelerating professional learning. Meanwhile, "similar to identical"

implementation schedules significantly enhanced learning opportunities by providing coaches with real-time, comparable observations of teacher instruction across classrooms and buildings. Having a constant source of knowledge about how new resources and approaches were being implemented dramatically improved the coaching team's ability to improve. Despite its advantages, the instructional support system developed by the coaches had consequences for power over instructional choices and institutionalized inherent systemic conflict.

In contrast to the curriculum, which was directed by policy knowledge, the decision-making processes for district instructional reform and professional support were teacher-driven and relied on teacher expertise. The vision of the superintendent, Dr. Allen, for Batali was teacher ownership of decision-making processes and shared resources. Consequently, norms for instructional coaching, which were common across all six coaches, incorporated teacher-led decision-making by having teachers plan their own professional learning. Professional support was teacher-driven and targeted based on specific local needs. After teachers experimented with a new lesson, for example, they often received "Menus" with continuing support options. The menu included things like, "I want you to come in and model a lesson" or "I'd like to plan a lesson together." Batali's organizational climate facilitated the ability of the coach team to spread teacher knowledge across the district in two additional ways.

First, the district administrators provided the coaching team with an online file-sharing and communication infrastructure enabling the development of a cache of the "best" ways to implement particular lessons or strategies, or the district's "best practices." The online database of exemplar lessons, videos of model lessons, and professional development materials were on a Google drive that all Batali teachers could access. This gave coaches and teacher leaders access to a vast pool of grade-specific, contextualized, content knowledge and innovations in teacher

practice, which the coaches coordinated across schools with the help of their grade-level leadership team. The theme examines conflict at the nexus of classroom observation and professional learning. Second, grade-level leadership and professional learning communities were a counterweight for the rigid curricular policies. The Batali Way limited teachers' discretion over classroom instruction, which was difficult for some educators in the district. However, Dr. Allen and Liz Grayson, the assistant superintendent, considered teacher buy-in vital for policy implementation. Grade-level committees were one of the primary organizational vehicles for maintaining a culture of teacher-led decision making.

2.6 Discussion and Conclusion

This study shows how instructional coaches use expertise to manage inherent systemic conflict when supporting standards-based reforms. In recent years, accountability reforms have elevated test scores, sanctions, and individual rewards as policy solutions and imposed beliefs about human motivation from the private section on public schools. However, the institutional change emerging at the district level reflects a different set of values that express an opposing ideology: teacher professionalism. This study sheds light on how instructional coaches manage political tensions between bureaucratic accountability related to rigid curricular programs and teacher development, which calls for mutual respect, trust, and collaboration with teacher colleagues. While there was some evidence that Batali teachers resisted the high expectations for program fidelity, the overall climate generated teacher buy-in. How was this possible?

First, the instructional coaches systematically incorporated teacher feedback into professional development and incorporated teacher adaptations into curricular program improvements. Program changes were not permanent, but rather part of a process of continuous

improvement that incorporated a constant review of new teaching approaches and lesson plans within the coaching team and other professional learning communities. Second, the instructional coaches provided a cache of teacher-developed resources that were targeted and context-specific. In other words, the resources were meaningful for teachers with immediate utility – teachers were able to use the resources to solve relevant instructional challenges. Third, the instructional support system developed and managed by the instructional coaching team lay the foundations for systemic reform. District policy changes were filtered through a coherent curricular program and intervention system that minimized uncertainty; teachers knew when changes were coming and why. Fourth, instructional coaching was further facilitated by administrative support; district officials assumed management roles and, by and large, worked to maintain an organizational climate that facilitated the exchange of ideas and data-driven instructional improvement. Thus, even though the instructional coaches in this study had to stay within the confines of the state accountability system, including a highly prescriptive curricular regime, they managed to create an environment where teacher buy-in flourished, enabling collaboration and professional learning.

This study has significant theoretical and practical implications. First, my research indicates that the stratification of leadership opportunities at the district level, particularly the widespread adoption of instructional coaching, augurs a significant, yet easily overlooked, institutional shift in response to accountability reforms. Historically, teacher professionalism has been impeded by teachers' limited control over their working conditions. In this study, however, the district-level coaching team – a group of expert teachers – was the primary driver of district policy change and implementation. Moreover, formal subgroups of teacher leaders organized around the curricular structure substantially enhanced the coaching team's access to professional

expertise and accelerated collective knowledge building. My finding supports assertions that distributing leadership responsibilities, particularly common resource development, improves innovation, stakeholder buy-in, and collaborative knowledge-building (Spillane, Halverson, & Diamond, 2004).

The group aspect of instructional coaching is significant. Despite the rapid growth of instructional coaching policies, few studies consider coaching groups as a formal organizational unit, instead focusing on the informal, social location of coaches as an indication of their influence over district reform (e.g., centrality, etc.). Yet research on intra-organizational diffusion suggests that organizational units vary considerably in their ability to utilize and transfer knowledge (Tsai, 2001). Future research may consider instructional coaching teams as "high-implementing subgroups," which are specialized groups of instructional experts saturated by multiple, diverse sources of knowledge. Past studies indicate high-impact subgroups can improve district policy implementation (Frank, 2015). Moreover, scholarship that examines the role of social network structure in policy implementation indicates network modularity, characterized by clustering in subgroups, facilitates innovation and knowledge diffusion.

Collaborative learning within their "grade-level teams," as well as their cross-grade collaboration as a coaching team was an important part of developing "know how" for program implementation in Batali. Early attempts to develop expertise in all grade levels proved unmanageable. Instead, the coaches divided expertise amongst team members –and shared resources. Collective IQ is a group concept derived from the literature on networked improvement communities (NICs) that refers to a group's capacity for responding to complex problems (Engelbart, 2004; 2008). In educational literature, NICs are teams of district leaders that focus attention on their own existing improvement capabilities and work intentionally to

become more effective at solving system-wide problems (Bryk et al., 2015). The team's collective IQ significantly reduced their workload and improving instructional capacity across grade levels. Over time, the coaches' collective IQ increased, helping them learn the practical knowledge needed to implement the district programs with fidelity to district policy, while also incorporating local teacher adaptations that improved outcomes and maintained teacher buy-in. Overall, introducing concepts like collective IQ, which consider group capacities, into coaching research may help researchers better understand factors that improve systemic change.

Just as the theoretical components of NICs informs this work, this study informs the current work on NICs and knowledge building for local educational policy implementation by illustrating the potential for district coaching teams as a unit of analysis. As educational policy shifts away from the high-stakes environment of NCLB to the more flexible and capacity-oriented framework of the Every Student Succeeds Act (ESSA), districts will need to think more systematically about instructional change, and administrators and coaches would greatly benefit from these pathways for inquiry (Finnegan & Daly, 2016). On the other side of the coin, the current saturation and rapid expansion of instructional coaching as a lever of district reform represent a large and growing sample of analytical units for implementation science and NIC scholars looking for opportunities to generalize their conceptual frameworks and forward the theoretical propositions of their respective fields.

Second, this study provides a contrast between coaching for a program and coaching as a district-level institutional reform with two key takeaways. First, my findings corroborate past research that argues that when coaching that is site-based, collaborative and incorporates practitioner input, instructional coaches propagate a professional working environment for teachers. This study provides evidence that when coaches focus on organizational improvement

in general and not the short-term implementation of a specific program, they can be effective mechanisms for systemic reform. At the same time, my study also unearthed the conforming effect of program fidelity. Significantly, these findings suggest that there is a trade-off between prescriptive curricular programs and teacher innovation.

Third, this study provides insight into the role of teacher expertise in policy reform. The coaches relied on teacher relationships for myriad reasons. Teacher expertise was vital for improving instruction and solving implementation challenges. Some researchers have noted that coaches rely on mechanisms of social influence rather than institutional control to influence teacher practice. This study also indicates that social relationships are instrumental for pooling knowledge for teaching at the district level. Part and parcel is the notion that knowledge for teaching is embedded in practice, and is difficult to convey through explicit communication. At the political level, one ongoing frustration experienced by teacher advocates is the idea that teaching does not require a high level of technical expertise, echoing antiquated notions of teachers as semi-professionals. My findings indicate that teaching is highly complex and difficult to improve using traditional top-down, bureaucratic policy levers. Rather, my findings buttress updated notions of policy implementation that call for a flexible approach to reform that attends to unique local challenges and that incorporates autonomous teacher decision-making.

While these findings are compelling, this study has several limitations. First, the findings from this study apply to a single case and are not generalizable to other contexts. The theoretical applications of this work could be expanded to study coaching teams and district-level politics related to standards-based reform. Second, this study was conducted in a relatively affluent, mostly White school district with few of the challenges present in districts with high numbers of impoverished, racial minority students. The organizational stability associated with high levels of

social capital present in affluent communities cannot be overlooked and is likely a major contributing factor in the success of Batali's instructional support system. High-needs school districts, particularly in urban settings, face an array of unique social and instructional challenges that would likely put serious strains on Batali's organizational system. Batali, for example, had very little teacher turnover and very few problems with absenteeism – both common issues, among many, in less affluent school districts.

In sum, while instructional coaching has been analyzed as part of a broader institutional context, it has not been conceptualized as a kind of institutional response. The feedback model of policy change observes that policies creates policies (McDowell, 2001; Mehta, 2014). Given the widespread popularity of coaching and other forms of teacher leadership in response to standards-based accountability policies, more research is needed to understand how policies generate local institutional responses. Clearly, ideological norms trickle down to the district level with significant implications for local educational policy formation, but are there also "trickle up" effects? The success of instructional coaching for district capacity-building and its evolution from a support for program interventions to a district policy for systemic reform is notable. Moving forward, instructional coaching may provide the institutional bulwark to provide advocates of teacher professionalism with an alternative policy to performance-based accountability for educational improvement. Moreover, my findings indicate instructional coach teams revert power over district instructional reform back to teachers. Instructional coaching provides an opportunity for teachers to advance professionally as experts in pedagogy and content, forming the basis of a highly skilled class of teacher leaders with formal power over instructional policy.

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ESSAY 3

HOW IDEAS SPREAD: DISTRICT-LEVEL INSTRUCTIONAL COACH TEAMS AND TRANSACTIVE MEMORY SYSTEMS

3.1 Purpose and Objectives

While the capacity of individuals is important for successful district reform, districts also need to build collective capacities that attend to the whole district system. Recognizing that educational improvement is complex work, scholars have invoked the notion of "systemic reform" to shift focus onto the broader district system that shapes how schools and educators respond to policy change (Elmore, 2000; Finnegan & Daly, 2016; Newmann, Smith, Allensworth & Bryk, 2001). Research on implementation and scaling up suggests that school systems often lack an infrastructure for improvement (Peurach & Neumerski, 2015). Districts may be aware of effective programs and practices for improving educational outcomes, but the lack of processes for communicating and collaborating across classrooms and schools severely limits organizational learning (Murnane & Nelson, 2007). Instructional coaching is one district strategy for supporting systemic change and promoting inter-organizational communication, particularly between district administrators and schools. A number of high-profile studies of systemic reforms such as Success for All and America's Choice have found correlations between the implementation of instructional coaching and student achievement gains (Biancarosa, Bryk, & Dexter, 2010).

Implementation research shows that educators are social actors constantly making sense of district policy expectations by interpreting reforms through their own experiences and beliefs about teaching (Coburn & Russell, 2008). Instructional coaches facilitate this process by acting

as “professional sense-makers” who help teachers interpret district initiatives and develop classroom strategies to align with reforms. A growing body of work corroborates this notion, suggesting that instructional coaches influence formal and informal school infrastructures in ways that frequently more tightly couple teacher practice with ongoing district reforms by building important capacities for district policy implementation (Coburn & Woulfin, 2012; Hopkins, Spillane, Jakopovic, & Heaton, 2013; Spillane, Parise & Sherer, 2011).

Despite the rapid growth of instructional coaching policies as a lever of district reform, few studies consider coaching groups as a formal organizational unit, instead focusing on the informal, social location of coaches as an indication of their influence over district reform (e.g., centrality, etc). Yet, research on intra-organizational diffusion suggests that organizational units vary considerably in their ability to utilize and transfer knowledge (Tsai, 2001). Moreover, research on organizational learning and social networks in schools suggests that “high-implementing subgroups,” which are specialized groups of instructional experts saturated by multiple, diverse sources of knowledge, may improve district policy implementation (Frank & Penuel, 2015, p. 394). To date, however, few studies have taken an in-depth look at coaches as a collective group unit, or considered how coaching teams influence district policy. This essay addresses this gap in the literature by exploring the link between coaching teams and district policy implementation.

This article builds on research on social networks, organizational change, and policy implementation in educational systems. A district’s capacity to implement reforms is highly dependent on teacher and administrator social networks, or patterns of informal social relationships, for spreading new ideas, distributing resources, and professional learning. My analysis focuses on one specific capacity for change supported by district social networks: intra-

organizational knowledge building. I pay particular attention to the diffusion of new ideas for integrating reform initiatives into ongoing teacher practice – an essential part of the teacher sense-making process during policy implementation. Recent research on district improvement and organizational change emphasizes the importance of locally adapted knowledge, or "know-how," for policy implementation (Frank & Krause, 2015).

In teaching, "know-how represents the local knowledge needed to efficiently integrate the new practices into the specific conditions of the teacher's classroom and school" (Frank & Krause, 2015, pp. 378-9). Know-how is specific to subject matter and local context and includes, for example, expertise in implementing curricular activities and ideas for differentiating student learning (Schulman, 1987). A district-level team of expert educators, like school-based coaches, can dramatically accelerate knowledge sharing by facilitating access to the unique resources from their buildings– namely the know-how of their staff. Thus, district-level instructional coaching teams, as a hub of inter-school communication, may represent a vital knowledge building resource for supporting system-wide district change. Instructional coaches have been studied as instructional leaders, teacher developers, and, to some extent, as capacity-builders for districts, but no research to date has considered a collective unit of instructional coaches

To explore this phenomenon, I draw from a comparative case study of two districts in Indiana to examine how instructional coach teams build capacities for generating and distributing local know-how. Both school districts had established formal district teams of building-level instructional coaches who explicitly facilitated systemic district reform. In both cases, the development and distribution of know-how for implementing new policies or program reforms was a primary responsibility for the coaching teams. In addition, the coaching teams in both districts utilized similar strategies to promote knowledge sharing and knowledge distribution:

informal communication networks and district intranet systems. Intranets – private Web-based networks or software for internal use – are a technological innovation that can facilitate knowledge management, communication, and collaboration in organizations. In these districts, the instructional coach teams structured informal intranet systems using free, online data-sharing platforms and virtual communication programs, including social media, to keep records, disseminate information, exchange instructional resources, maintain an online knowledge vault, and host group discussions. Comparing these teams and their use of intranet technology provided insight into coaching activities that involve collective action around capacity-building for district-wide change.

3.2. Literature Review

The literature review focuses on the relationship between social networks and instructional coaching, as well as teams and networks.

3.2.1. Social Networks and Instructional Coaches

Social relationships are prominent in scholarly accounts of educational change. For decades, educational researchers have documented the importance of social capital in propelling school improvement and instructional reform (Bryk & Schneider, 2002; Frank, Zhao, & Borman, 2004; Coburn & Russell, 2008; Coburn, Mata & Choi, 2010). Social relations can provide educators with access to a wide range of resources, such as relational trust (Bryk & Schneider, 2002), expertise (Daly & Finnegan, 2011; Frank et al., 2004; Spillane, 2004), information about local "know-how" and organizational norms (Frank, 2015), access to collaboration and sense making related to instruction (Coburn, 2004), and knowledge about new instructional policies (Penuel et al., 2012). The structure of social relations, or the social network, is defined by the

social interactions, or "ties" between network actors, which both constrain and enable the exchange of social capital between educators within schools, as well as between schools by mediating interactions between district leaders and school personnel (Daly & Finnegan, 2011). Social network research indicates that teachers may need different kinds of professional development and collegial interactions to sustain reform efforts (Penual, Sun, Frank, & Gallagher, 2012), echoing a common theme in the policy implementation literature which emphasizes the importance of leaders in framing and coordinating reform activity (e.g. Bryk & Schneider, 2002; Daly & Finnegan, 2012; Honig, 2012).

Through focused discussion, task-oriented feedback, and high quality interactions, coaches can exert influence on teachers' practice. Interestingly, these interactions not only appear to increase instructional expertise, but they also improve and promote expertise-seeking behaviors, suggesting that coaches are intimately involved in the formation of teacher social capital, while also enabling teachers to recognize it in others (Atteberry & Bryk, 2010; Coburn et al., 2010). Facilitating the diffusion of know-how, or knowledge of reform expertise, is critical for organizational improvement and depends on how teacher networks are structured. In the past, social network scholarship on educational improvement has focused more on intra-school relationships, but recent research has refocused attention on inter-school relationships (e.g., Bryk et al., 2015). Research on networked forms of implementation and district networks, for example, indicate that inter-school ties are an important source of innovation and knowledge building.

Network research suggests that coaches embedded in cohesive subgroups of teachers may serve to function as a broker between groups facilitating the flow of expertise and knowledge within and across subgroups – a "hub in the school's collegial structure" (Penuel, Riel, Krause,

& Frank, 2009, p. 157; Spillane & Kim, 2012). Because coaches work with many groups of teachers and administrators, they are uniquely placed to access, append, and diffuse policy information vertically and horizontally within and between schools (Daly, Finnegan, & Moolenaar, 2014; Huguet et al., 2014; Swinnerton, 2007; Woulfin, 2014). This is important for building knowledge and capacity. Spillane and Kim (2012), for example, find that subgroups of mathematics teachers that included at least one formal instructional leader were more likely to trust each other and couple reform goals with their own practice. Importantly, access to coaches and formal instructional leadership through schools' social networks appears to be more important when teachers have limited access to other forms of professional development (Penuel, Frank, & Krause, 2010). Despite promising findings on the impact of instructional coaching, however, few studies consider formal groups, or teams, of instructional coaches as a mechanism for knowledge building.

3.2.2. Social Networks and Teams

Network scholarship encompasses a wide variety of analytical perspectives for understanding team activity. A small but growing body of work focuses on networks and small groups (e.g., Lazer & Katz, 2003), but the literature has largely neglected the role of formal teams in intra-organizational networks. Social scientists in the 1950s and 1960s used network methodologies to explore communication patterns in small groups (e.g., Bavelas, 1950; Shaw, 1964), but this trend diminished in subsequent years. Two comprehensive reviews of the literature on networks and teams compiled by Nancy Katz and David Lazer provide some insight into how networks influence team effectiveness. Table 3.1, which is adapted from work by Lazer & Katz (2003) summarizes the potential relationship between network characteristics and team effectiveness.

Table 3.1. *Hypothesized favorable network characteristics for different kinds of team activity*

Team Activity	**Favorable Network Characteristics**
Complex knowledge transfer	Strong ties, Accurate cognitive networks
Simple knowledge transfer	Weak ties
Simple coordination	Centralized network
Complex coordination	Dense, decentralized network
Public good/free rider issues	Strong ties External embeddedness
External informational needs	Diverse external ties

In the team literature, there is no exact parallel to a network tie – however, communication patterns are a key ingredient in both networks and teams. Some studies, for example, examine how frequently team members talk and the content of their discussions (Larson et al., 1996). Notably, communication is typically captured as an individual attribute, rather than at the dyadic (i.e., tie) level. Given the importance of social networks for organizations in general and school systems specifically, it is reasonable to expect that ties also matter at the team level.

Network scholarship provides several important hypotheses for understanding team effectiveness, particularly for knowledge-building. One of the most important resources that social capital offers is access to knowledge, including cognitive knowledge networks, or "who knows what" (Contractor, Zink, & Chan, 1998). Trust amongst team members facilitates the exchange of ideas. At the same time, knowledge building in networks also depends on having access to different parts of the intra-organizational social system, which will yield non-redundant information (Granovetter, 1973). Centrality in a network provides individuals with access to a wider array of information and knowledge (Burkhardt & Brass, 1990). It is reasonable to predict that teams with central locations in intra-organizational networks will be more effective than those located on the periphery because of superior access to information and knowledge. Ancona

and Caldwell (1992), for example, found that teams that interactively solicited information and feedback from their environment were more effective than those that shared existing information within the team. In relation, bridging structural holes within the organization will maximize the amount of new information to which the team has access. Thus, it is also reasonable to predict that teams that bridge structural holes will have an informational advantage.

While network concepts are easily mapped onto the team literature, the same cannot be said for the reverse. According the Katz and Lazer (2003), the closest parallel in the team literature to social capital is the notion of process gains. Process gains are the synergies that emerge from teamwork – as oppose to simply aggregating individual contributions (Hackman, 1987). Process gains include any benefit that results from team interactions, and make a team's success on a task greater than they would be if team members simply pooled their individual efforts (Fiore, Salas, & Cannon-Bowers, 2001). Within the process gains literature, researchers have pointed to motivation gains and coordination gains as key components of process gains in teams. Motivations gains are characterized by higher effort of individuals on teams, which may result from interpersonal competition or group identification. Coordination gains, meanwhile, are group tasks that cannot be effectively carried out by individuals and result from team collaboration (Huffmeier & Hertel, 2011).

Finally, the team and small group literature introduces a common issue that plagues team effectiveness: free riding. Free riding, or "social loafing," refers to the tendency of individuals to let others do their work for them. One way to reduce free riding is to introduce individual accountability (Harkins, 1987). Network ties may encourage individual accountability if team members are embedded in similar social systems. If two team members have common external ties, there will be reputational ramifications for those individuals (Granovetter, 1985). In

addition, the expected duration of team ties may mitigate non-cooperative behavior. If team members expect the relationship to persist into the further, the team is less likely to suffer free-riding problems (Axelrod, 1981).

3.3. Theoretical Framework

The theoretical framework couches the district-level work of instructional coach teams in terms of transactive memory systems with particular consideration for the role of technology in knowledge sharing.

3.3.1. Transactive Memory Systems as a Public Good

The theory of transactive memory explains how group members, each with their own set of skills and expertise, develop communication networks that help them identify and leverage the skills and expertise of others in the group (Hollingshead, 1998; Moreland, 1999; Wegner, 1987, 1995). These network ties facilitate flows of knowledge within the group, thereby reducing the need for each group member to possess skills or expertise available elsewhere in the group. A transactive memory system is a "division of cognitive labor" that reduces the informational burden placed on individuals, while still providing the whole group access to a larger pool of knowledge (Hollinger et al., 2003, p. 337). By working together, groups can retain and access more knowledge than they would as separate entities.

Prior research had linked transactive memory systems to improved team performance (Hollingshead, 2000; Huang, Liu, & Zhong, 2013; Lewis, 2004). Research also suggests that transactive memory systems facilitate knowledge management activities, including creativity, retention, and information exchange (Argote, McEvily & Reagans, 2003). According to Lewis (2004), transactive memory systems have three components:

1. Specialization: The differentiated structure of member knowledge
2. Credibility: Members' beliefs about the accuracy and reliability of another member's knowledge
3. Coordination: Effective and orchestrated knowledge processing

When teams are supported by a transactive memory system, team members will recognize, trust, and coordinate specialized knowledge. Some examples of specialized knowledge in educational settings could include grade-level or context expertise, technology integration skills, differentiating student needs, or developing standards-based assessments. There is also a variety of specialized knowledge for coaching, such as working with principals, facilitating teacher conversations, helping teachers reflect on practice, and evaluating schoolwide data.

3.3.2. The Public Goods Theory of Collective Action

The public goods theory of collective action draws on theories of mutual interest and collective action. Its main premise is that network actors mutually benefit from coordinating action, and these benefits often outweigh individual self-interests (Marwell & Oliver, 1993). First developed by Samuelson (1954), pubic good theory articulates the economics of collective versus private ownership, explicating the advantages of common material infrastructures such as schools, roads, and parks. The public goods theory of collective action, meanwhile, focuses on what motivates members of a group to contribute their resources to the development of a collective resource for public consumption (Hardin, 1982). The calculus of collective action suggests that individuals will forge ties and form a group to maximize their shared ability to leverage and mobilize resources. There are two key characteristics of a public good.

First, to be considered a public good, the resource must be non-excludable (Hardin, 1982; Olson, 1965; Samuelson, 1954). That is, every member of the group has a right to benefit from the public good without exception. Access is granted irrespective of their contribution to its creation or maintenance, which is known in the literature on group research as the "free rider" problem. Second, the resource must be non-rival, so that one member's use of the resource does not reduce the amount available to the rest of the group. A cache of know-how for educational improvement, or a transactive memory system, generally foots this bill. In this case, some of this system is also virtual, existing within a district intranet. Increasingly, organizations have been providing technological support for knowledge sharing via intranets. According to Fulk et al. (2001), depending on the configuration, intranets can support:

1) Individual activities, such as updating personnel records
2) Formal information dissemination, such as policy manuals
3) Guides to knowledge and knowledge holders, such as expert directories
4) Individual and group data, information and knowledge sharing, such as jointly maintained repositories
5) Group interaction via synchronous or asynchronous methods, such as group discussions

Technology use is on the rise in educational systems, although this phenomenon has generally been studied as a factor in classroom learning, such as the implementation of computer use for instruction. Fewer studies have considered how technology enhances teacher professional development or district policy implementation – both important functions of district-level instructional coaches.

More broadly, virtual teams have emerged as an important component of modern inter-organizational systems. Virtual teams are geographically dispersed work groups that use intranets to carry out organizational tasks, particularly information diffusion (Powell, Piccoli, & Ives, 2004). Virtual teams have the ability to broker across organizational boundaries and overcome traditional time-related and geographical challenges. District coaching teams may be viewed as a kind of district-level virtual team that facilitates inter-school communication and cooperation. Departing from this analytical viewpoint, this essay aims to answer the following research questions:

1. How are district-level coaching teams organized?
2. How do district-level coaching teams use intranet technology to support district reform?
3. What are some of the major similarities and differences between district-level coaching teams that use intranet technology to support district reform?

3.4. Data and Methods

With the aim of answering questions about how coaching teams facilitate systemic change, I conducted a comparative case study of instructional coaches' implementation behaviors and activities (Lin, 1998). The districts, Batali and Waters, were selected from a larger study of teacher social networks and classroom practice in nine Midwestern school districts because of their existing, well-established elementary school coaching teams and their use of intranets to share and manage instructional resources. Note that pseudonyms are used for districts and educators. This study focuses on each district's elementary school coaches (K-6), although Waters also had three middle school coaches on their team. In addition, instructional coaches in both districts were assigned to one school each, providing an opportunity to examine cross-

school communication networks. Despite their similarities, the districts differed in terms of student demographics, size, institutional/organizational structures, and policy context (see Table 3.2).

Table 3.2. *District information for Batali and Waters*[4]

District	Total Enrollment (approx.)	%Free/ Reduced Lunch (approx.)	%Non-White (approx.)	Number of Instructional Coaches (K-8**)
Batali	8,000	20-25	20-25	6
Waters	12,000	60-65	70-75	15

Batali is a smaller district with a more affluent population than Waters. The districts also used different grade-level structures for elementary instruction. Batali's elementary schools included grades K-5, while Waters had K-4 elementary schools and intermediate schools for grades 5-6. Multiple data sources about district policy processes and instructional coaching – including questionnaires, interviews, observations and policy documents – were collected over a one-year period from the district coaches and administrators. The questionnaires inquired about factors that the literature suggested might be relevant for knowledge sharing during district reform such as professional support for coaching, the district climate, coaches' beliefs about improvement, and their implementation behaviors. Importantly, the questionnaires aimed at gathering background information about the district and coaches, as well as social network data about the coaching teams. The questionnaires were not designed to directly answer my research questions and, thus, did not inquire into some of the study's major constructs, such as intranets, because these concepts emerged from subsequent examination of qualitative data. A complete

[4] Pseudonyms were used for districts to protect the anonymity of sources. Most of the coaches were elementary school coaches (K-6) Waters team has three middle-school coaches who were included because they participate in the district team

overview of the questionnaire and responses can be found in the Appendix (see Figures A.3.1 and A.3.2).

For analysis, I used descriptive social network analysis and inductive qualitative coding to draw out the characteristics of my data and develop themes and categories (Corbin & Strauss, 2015). The social network analysis was aimed at describing the group structure in relation to individual and team attributes. The main network question asked coaches to list colleagues with whom they discussed coaching and/or support strategies for improving teacher practice and the frequency of their interactions (i.e., less than once a month, 1-3 times a month, 3-4 times per week, every day). I created and analyzed social network diagrams of each district coach team using UCINET software (Borgatti, Everett, & Freeman, 2002). Additionally, I applied Lazer and Katz (2000)'s method for calculating individual-level and group-level network characteristics for teams called intra-team density and extra-team density, respectively. In network terms, density is defined as the ratio of reported ties over the number of potential ties.

Next, I conducted semi-structured interviews with three instructional coaches from each district for a total of six coaches. I purposively sampled at least one coach with a high proportion of ties outside of the coaching team and one that was fairly insular as defined by a high proportion of ties with other members of the team, but not to non-team actors. I also interviewed district officials from each district who managed the coaching teams – one from Batali and two from Waters. I conducted two one-hour interviews with each participant for a total of 18 interviews. I also conducted five half-day observations of both district coaching teams working together at team meetings – for Batali, those meetings were weekly for all six coaches, while Waters held bi-weekly that alternated between two cohorts of coaches. Tables 3.3 and 3.4 display basic information about the interview participants.

Table 3.3. *Waters Interview Sample*

Pseudonyms	***Gender, Race***	***Professional Background***
Team Administrator	Male, White	Teacher for 8 years Principal for 2 years District Administrator for 5 years
Team Manager	Female, White	Teacher for 12 years District Administrator for 3 years
Coach 4	Female, White	Teacher for 5 years Coach for 3 years
Coach 8	Female, White	Teacher for 8 years Coach for 3 years
Coach 9	Female, White	Teacher for 15+ years Coach for 5 years

Table 3.4. *Batali Interview Sample*

Pseudonyms	***Gender, Race***	***Professional Background***
Team Administrator/Manager	Female, White	Teacher for 15+ years Principal for 5+ years District Administrator for 5 years
Coach A	Female, White	Teacher for 1 years Coach for 6 years
Coach C	Female, White	Teacher for 10 years Coach for 3 years
Coach D	Female, White	Teacher for 15+ years Coach for 5 years

Throughout the study, I took extensive field notes on and examined various individual and group-level artifacts based on emergent patterns in my data, such as weekly schedules, meeting agendas, planning templates, online resource databases, and a wide range of coach-developed professional development materials. I used qualitative content coding to analyze my data, which were then examined and re-examined several times using various techniques, such as constant comparison and matrix tables, to iteratively draw out themes and categories. The validity of the data coding was checked using member checking and triangulation.

3.5. Findings

Given the theoretical focus of this essay, my findings focus on describing similarities and differences in how the coaching teams were organized and how they carried out their work. Despite major demographic and organizational differences, the districts' intranet structures and communication networks were the building blocks of district transactive memory systems. To address my research questions, I first describe how the coaching teams were organized, focusing on similarities and difference between the districts in three areas: district policy and reform, organizational structure, and social networks. I then explore how the districts intranet systems were organized, comparing and contrasting the districts throughout.

3.5.1. District Policy and Reform

In terms of policy context and district reform, Waters was implementing multiple new policies, while Batali was mainly revising existing programs. While both coaching teams were implementing policy change, on balance, the team in Waters was adapting to more change and innovation than Batali. In interviews and questionnaires, the majority of instructional coaches in Waters reported that the district was undergoing significant change. During interviews, all three of the coaches in Waters described major policy changes they were supporting, while 73% of the coaches agreed that the district officials and school leaders were constantly learning and trying new things on the questionnaire. In contrast, less than half of the coaches (33%) in Batali reported that local leadership was constantly trying new things – a pattern that was echoed in interviews. Moreover, all of the Batali coaches that were interviewed described policy reform as incremental. As one coach put it, "we don't do big changes here, we do small tweaks." For analytical purposes, I focused on one significant policy change in each district.

In Waters, the policy change I focused on was the district's implementation of digital learning, which focused on integrating computer technology into classroom instruction. The digital learning initiative had two components: blended learning and personalized learning. Blended learning refers to the incorporation of technology-enhanced instruction, such as online learning, into classroom teaching. Personalized learning, meanwhile, refers to facilitating individualized student learning using computer-based programs. Both initiatives were in their second year of implementation at the time of this study. A major part of the coaches' work was to develop district-wide and school-wide professional development workshops aimed at blended learning and personalized learning. The instructional coaches also supported teachers on an individual basis as they integrated new technologies, which included familiarizing teachers with an array of new instructional resources (e.g., software, SMART boards, student laptops, etc.) and techniques.

In Batali, the coaches were tasked with improving writing scores on benchmark tests and the state assessment. Policy changes, meanwhile, were relatively incremental and built on existing programs. Batali's district policy and the coaching team focused on maintaining fidelity to the district's curricular programs in mathematics and English Language Arts (ELA) – a policy referred to as "similar to identical" by both administrators and coaches. The district utilized documents called Curriculum Calendars that mandated daily lesson content and, at times, teaching approaches as well. Reform was shaped by a systematic review of student test score data, which prompted the coaches to revise the district's writing program. "Our writing scores were good," explained one coach, "but not where were wanted them to be." During the year of study, this was the major focus of Batali's team. Notably, the Batali team's approach was to "tweak" the existing curriculum, called 6+1 Writing, building on the resources and instructional

practices already in place. Differently, in Waters the instructional coach team supported major policy changes involving the integration of digital learning into classroom practice. In Waters, reform was driven by new policy initiatives emanating from a major influx of grant money that mandated the implementation of digital learning. Unlike the incremental change described in Batali, the digital learning reforms in Waters represented a major overhaul of the district's approach to instruction.

Both the questionnaires and interviews probed coaches about professional support for coaching, the district climate, and their beliefs about improvement (see Figure A.3.2. in the Appendix). The questionnaires show that both teams received external professional development related to the policy changes they were tasked with supporting. The professional development provided to the Waters coaches for digital learning was provided by Education Elements, a professional development company specializing in digital learning. The Batali team, meanwhile, went to one or two literacy workshops hosted by Kristina Smekens – a regional professional development expert in ELA – annually to learn new reading and writing strategies. In both cases, district administrators discussed in interviews how this process saved the district a substantial amount of resources that would otherwise be spent on professional development. The instructional coaching teams attended workshops and then translated the professional development material for all of the teachers in the district. They, for example, prepared example lesson plans and schoolwide professional development sessions, and gathered new resources. Moreover, in both cases the adaptation process was carried out by the group, not individuals, and the work was shared amongst team members. For example, in Batali, every coach adapted materials for one grade level and then they exchanged resources.

3.5.2. Organizational Structure

In terms of collaborating with administrators, the instructional coaches in both districts typically collaborated with their building principals on a weekly basis, and regularly interacted with district officials. The questionnaires revealed that district teams also had cohesive responses to their perceptions of the district implementation context and climate for innovation. In both cases, the coaches perceived a supportive district context that encouraged coordination between the district central office and school buildings, as well as collaboration across schools. Still, the coaching teams differed in some notable ways. First, the coaching teams also had different approaches to leadership and professional development. Generally, the Waters team had more interaction with district administrators and more external professional development for coaching than the Batali team. In terms of leadership, there were both administrative and management roles that were vital for operating the instructional coaching teams. In Waters, these roles – administrator and manager – were separated into two distinct positions. One district official, the "Waters Team Administrator," was the assistant superintendent responsible for academic achievement, while the "Waters Team Manager" was the professional development coordinator. The Waters Team Manager worked directly with the instructional coaches on a daily basis while the Waters Team Administrator oversaw the team's integration with other district systems. In Batali, these roles were combined into one district position, the "Batali Team Administrator/Manager," which was occupied by the district's assistant superintendent. I use these position titles throughout the essay to describe the activities of these district officials.

Administratively, the coaching teams had to be integrated into a wider district framework for professional development and teacher learning. In both districts, the teams were primarily responsible for supporting instructional reform, which meant coordinating and collaborating with

district officials to articulate a common vision for district-wide improvement. Managerially, meanwhile, the coaching teams needed direction in terms of their own professional development, appropriate program adaptations, implementation priorities, and coordinating resources across schools. The Batali Team Administrator/Manager played a more supervisory role, attending some meetings briefly, and identifying areas where she needed to intervene, but she generally had a very hands-off approach for managing the team. In contrast, the Waters Team Manager was much more involved with the coaching team and was characterized by her colleagues as the "coach of coaches." The Waters Team Manager also provided direct professional development to the coaches, meeting with every coach on a bi-weekly basis and coordinating resources and interactions across schools.

Finally, the structure and focus of team meetings were quite different between districts. In Batali, all of the coaches met every week on Friday and the agenda was set by ongoing professional development needs, particularly related to curricular program improvements. In Waters, the coaching team rarely discussed specific curricular programs, instead focusing on problems of practice related to digital learning, coaching challenges, and facilitating cross-school learning opportunities. The Waters Team Manager planned and set the agenda for the coach meetings, provided professional development for coaches throughout the year, and acted as a team broker, connecting coaches with each other during meetings, as well as outside of them. In Batali, these kinds of activities were self-organized by the coaching team. Since they interacted with each other frequently and the scope of district change was narrower, learning opportunities were easy to identify without a broker.

In keeping with their focus on program improvement, the Batali team reported having more professional development on district curriculum than Waters, while Waters had more

professional development for developing coaching skills, as well as digital learning. Interestingly, in both districts, instructional coaches interpreted professional development in terms of formal and informal arrangements. “They do send us to literacy workshops and things like that, which helps us grow our instructional practices” commented one coach, “but a lot of the PD is honestly done amongst the six of us.” This comment was reflected by the other coaches and referred to the strong norms for professional learning within the Batali team. The coaches were in the habit of learning new skills and strategies from each other. One of the new coaches on the team, for example, spent a lot of time visiting other buildings to observe and learn from more veteran coaches. The coaches began every meeting by either sharing best practices they had seen during the week or discussing something with which they were struggling. Between the two, sharing best practices was much more common - most of the time coaches brought sample lesson plans or teacher-created resources to share.

In Waters, the Team Manager and Team Administrator focused on developing coaching skills using Jim Knight’s collaborative coaching model books, which focused on coaching cycles that involved co-reflection with teachers. Because of the large number of coaches in Waters, the Waters Team Manager organized two cohorts of coaches and alternated meeting with them on Fridays. Each cohort met bi-weekly – one meeting was mandatory and focused on a specific topic related to either coaching or digital learning. For these meetings, the Waters team manager prepared learning materials, such as readings and discussion questions, to guide professional learning. The other meetings, called “coaching collaboratives,” were voluntary and more of an opportunity for coaches to discuss challenges they were facing. “We hash out whatever topic they bring to the table” explained the Waters Team Manager. The coaching collaborative

meetings were particularly important for coaches because of the depth of conversation with other coaches.

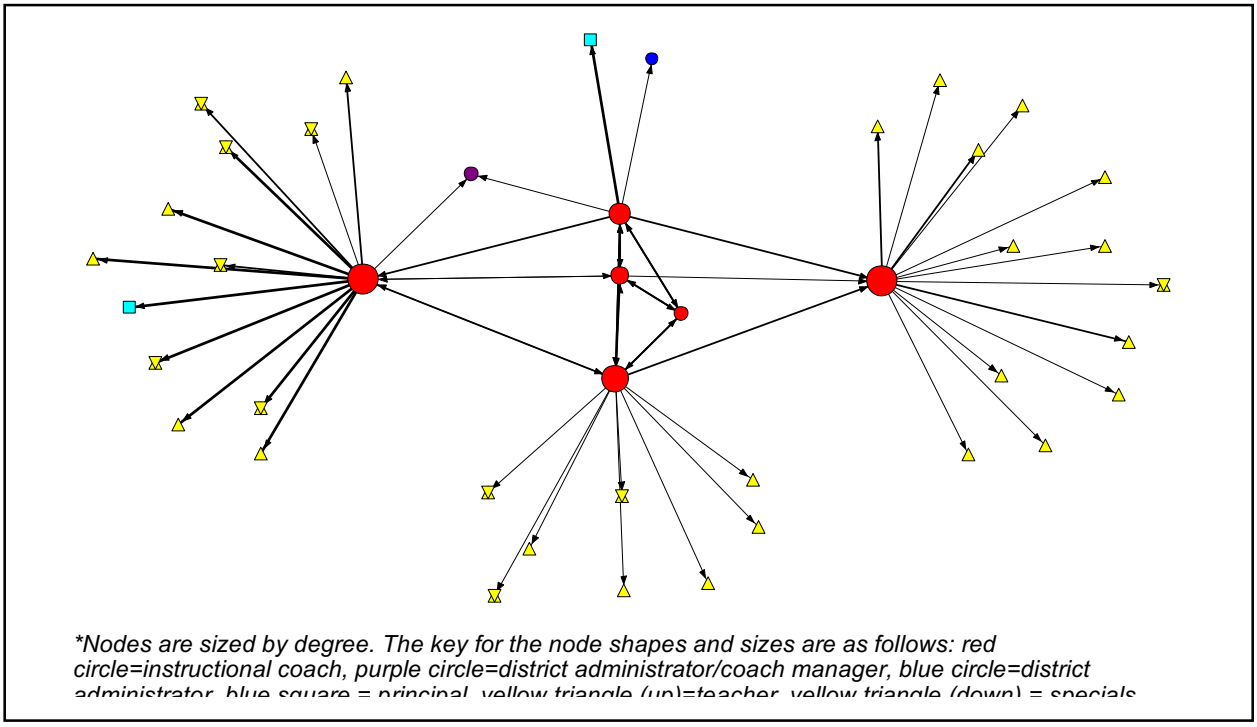
Finally, there were other important meeting structures for the instructional coaches that facilitated district-wide improvement. These meetings provided instructional coaches in both districts with multiple opportunities to share information and collaborate with other leaders in the district on instructional reform. In comparison to Waters, Batali had a much more centralized organizational system in terms of both decision-making and instructional support. In Batali, the coaches organized their expertise and learning around grade-level leadership – each coach was responsible for developing expertise in a specific grade level. Part and parcel to this framework was meeting with grade-level committees of teacher leaders that represented teacher PLCs from every building once a month. In Waters, there were professional development teams in every building focused on digital learning, which instructional coaches had to participate in. However, grade-level PLCs were not mandatory. In Waters, the instructional coaches also attended monthly meetings with all K-6 principals and district administrators to discuss district-wide improvement. Notably, the social network responses did not align with these findings.

3.5.3. Social Network Structure

Figures 1 and 2 show the team social networks for Batali and Waters. On the questionnaire coaches were asked to list up to 15 colleagues in their school district with whom they, "discuss coaching and/or support strategies for improving teacher instruction," as well as how frequently they interacted with those colleagues. In Batali, all the coaches (6/6) responded to the questionnaire, while in Waters 17 of the district's 19 coaches responded. Importantly, the networks only account for team members' nominations and do not show any ties between the actors they nominated. Broadly speaking, the instructional coaches were socially embedded in

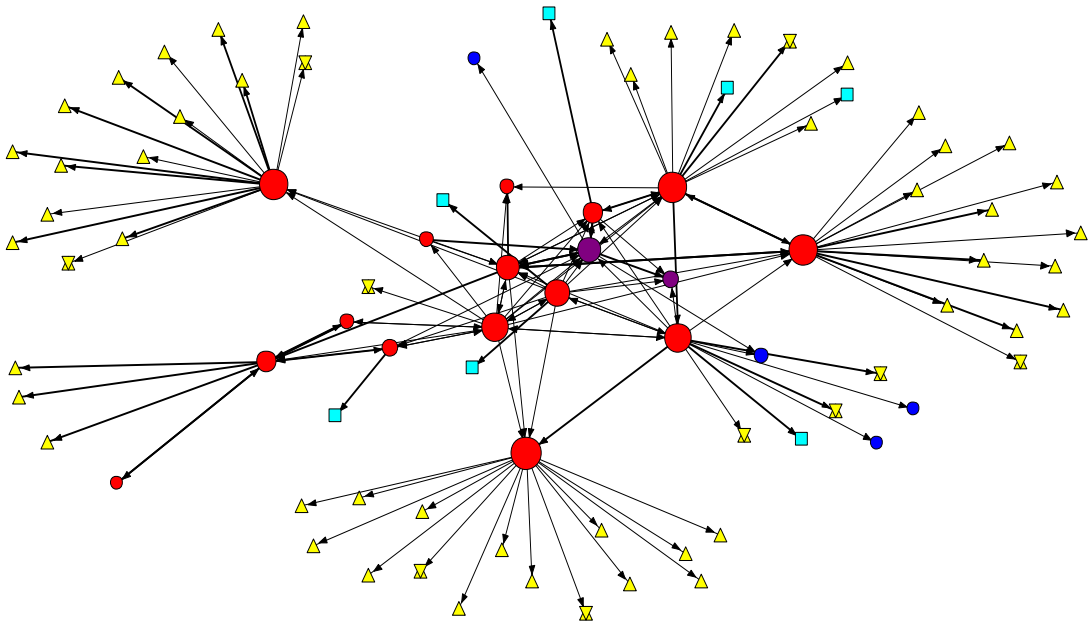
the formal team unit. When it came to strong ties, the instructional coaches in both districts were more likely to have strong ties with other coaches, which was defined as interacting on a weekly basis. Notably, the networks also show that coaches had a variety of relational motifs – some, for example nominated teachers more than administrators while others only nominated coaches.

Figure 3.1. *Instructional coach team network from Batali**



**Nodes are sized by degree. The key for the node shapes and sizes are as follows: red circle=instructional coach, purple circle=district administrator/coach manager, blue circle=district administrator, blue square = principal, yellow triangle (up)=teacher, yellow triangle (down) = specials*

Figure 3.2. *Instructional coach team from Waters**



**Nodes are sized by degree. The key for the node shapes and sizes are as follows: red circle=instructional coach, purple circle=district administrator/coach manager, blue circle=district administrator, blue square = principal, yellow triangle (up)=teacher, yellow triangle (down) = specials teacher.*

I also calculated team network characteristics, or team densities, which appear in Table A.3.1. and Table A.3.2. in the Appendix. The individual-level constructs include metrics for density-self, which correspond roughly to the embeddedness of each team member in the group. For comparison, I also calculated a measure of intra-team ties for other members of the team.

The network diagrams and team networks statistics show similar relational patterns in both districts with several notable differences. First, both district teams had two major types of coaches in terms of relational motifs. The first type only reported having close ties with other coaches and administrators and no ties with teachers. One of the coaches interviewed in each district was this type of coach. Interviews indicated that these coaches were newer to the district and did not have a long, personal history with the schools they were working in. In other words,

they did not have many pre-existing relationships with teacher colleagues when they became coaches. These coaches relied on other coaches and administrators for resources to support teachers and tended to integrate external professional development into their practice. The second type of coach in terms of relational motifs had more ties with teachers than coaches and administrators. Interviews with these coaches suggested these types of coaches had prior connections to the districts and schools in which they worked. Interviews indicated this type of coach focused on integrating teacher-generated innovations and frequently accessed teacher knowledge of instructional programs to inform implementation. The team density tables corroborate this pattern. In Batali, three of the six coaches (A, B, E) were highly connected to other team members with few ties to other colleagues, while four of the fifteen coaches (2, 8, 9, 13) in Waters were highly connected to other team members with few ties to other colleagues. The rest of the coaches in both districts had more ties to colleagues other than coaches.

Overall, the team density scores suggest that the Batali team was more cohesive with higher density-self scores. This finding is corroborated by interviews, which indicated that Batali was committed to a program with a more centralized decision-making process in terms of instructional reform. Consequently, the team had a more consistent vision for reform. This was also, in part, due to the incremental nature of reform in Batali. The team also met weekly, while the Waters team met half as often. Thus, in Waters, the coaches interacted with each other less frequently and a higher proportion of the Waters coaches had close ties with teachers. Interviews suggested that the Waters coaches interacted with colleagues about teacher innovations related to blended learning and personalized learning. In contrast, the Batali coaches interacted with colleagues about ongoing reforms to the district's curricular programs and existing resources. This comparison may suggest the coaches in Waters had more reasons to interact with teachers.

In both districts, the coach teams used intranet technology to interact, share ideas, and maintain instructional resources. The next section teases out the similarities and differences between the coaches' use of intranet technology to support district reform.

3.5.3. Using Intranet Technology to Support Policy Implementation

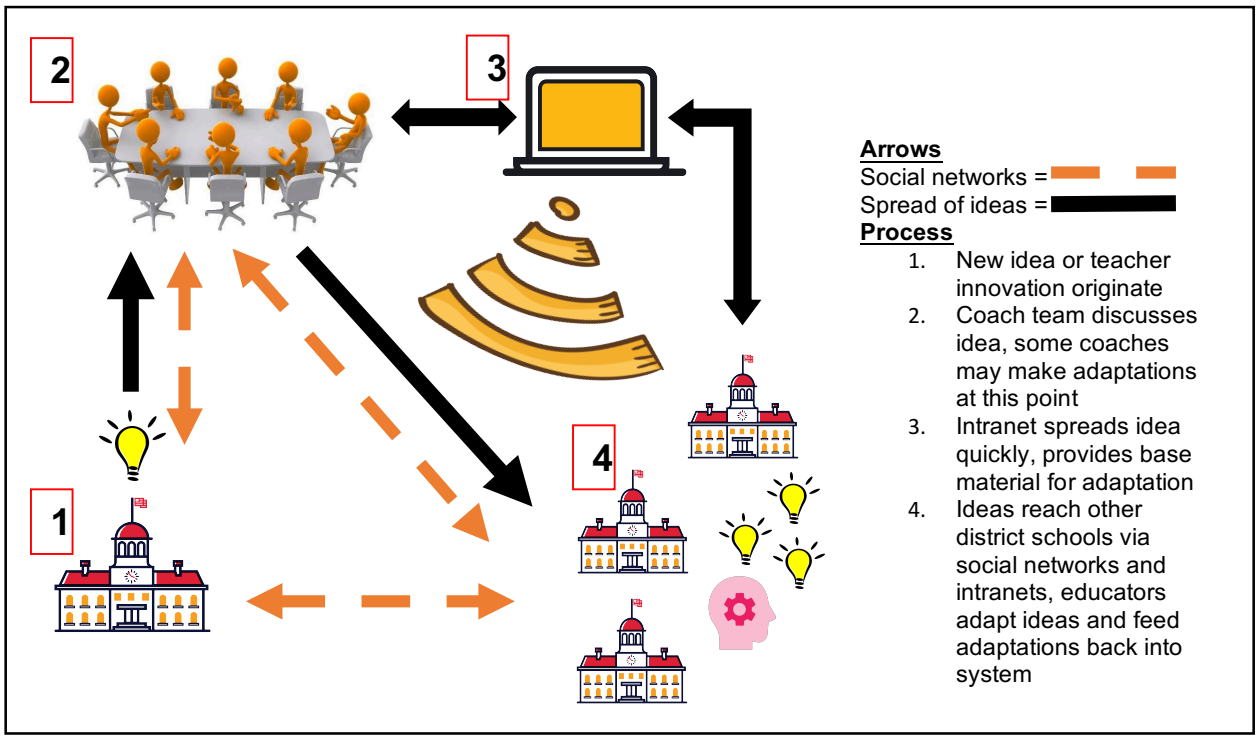
The instructional coach teams in both districts used sophisticated intranet technology systems to support policy implementation. Two key themes that emerged in both districts were solving problems of practice and facilitating the formation of collective expertise.

Solving Problems of Practice: One of the unifying themes across both districts was the instructional coaching teams' clear purviews to solve problems of practice related to district reform. Problems of practice were common classroom dilemmas that revealed themselves during reform implementation. To solve problems of practice, both teams utilized a sophisticated intranet to facilitate collective knowledge building. Notably, I only considered programs to be part of an intranet if they facilitated idea sharing and knowledge diffusion. Programs, like Acuity, DIBELS, and Lexia, helped collect and track student data and were, in a sense, an online shared resource but they were not considered part of the intranet because they only produced raw data. However, the team's shared drives often included templates and resources that helped instructional coaches process student data from these programs, particularly for coach-teacher collaborations around improvement.

In both districts, the main ways that instructional coaching teams identified problems of practice was by comparing their experiences. Because the instructional coaches operated in distinct school contexts, the scope of problems was easily identified, as well as the appropriate process for solving them. If the situation was unique to one school, this indicated that the

problem was likely school-specific. And if the issue was apparent in only a few schools, the affected coaches could collaboratively problem-solve. If, on the other hand, the coaches saw teachers experiencing the same issues in almost all of the district schools, the issue was discussed with the whole team. This process is depicted in Figure 3.3.

Figure 3.3. *How district coach teams facilitate knowledge building*



Problems of practice were further prioritized according to organizational goals. For example, during one team meeting in Batali, one of the coaches asked, "Is anyone else seeing problems with persuasive writing prompts in Grade 3?" Persuasive writing was an important component of the team's focus on better aligning the 6+1 curriculum with the state test. One of the coaches confirmed her suspicion, noting "I heard the third grade PLC talking about that on Wednesday." The rest of the team was not sure. The team spent the next week collecting

evidence on persuasive writing prompts and responses. When they met the following Friday to discuss their findings, they identified the primary issue: students were having trouble distinguishing between facts and opinions to support their main ideas. They began designing several example lesson plans – at least one for each grade level – to distribute to teachers. They also identified teachers across the district to access for further expertise related to the issue.

The Waters team followed a similar process for solving problems of practice, although they had a much more open system for identifying issues. In particular, the team used a variety of social media platforms and online communication tools to solicit advice and narrow down problems to focus on. For example, one coach posted a message to the team's Google Community page asking for coaches to "share some ideas for a Collaboration Rotation for ELA." This approach required students to collaborate using blended learning approaches. Another coach responded, "I have a couple of teachers who have really strong collaboration groups. I will have one reach out to you." During the next meeting, the coach who had asked for help shared what she had learned from the expert teachers. The example she shared involved setting up independent station choices for students to form groups and rotate between collaboration, digital learning, and small group discussion. Each group could focus on a variety of learning activities, including "Blogging," "Parts of Speech," "Citing Text Evidence," and "Lexia Skill Builders" – to name a few. She posted lesson plans and pictures of the teacher's classroom for other educators to borrow and adapt for their own purposes. The districts' intranets were the primary vehicle for facilitating the exchange of new ideas and resources to support reform.

Next, I found the district's intranets distinguished themselves in terms of system structure and utilization. While traditional conceptualizations of intranets typically refer to a single program, I found the coaching teams used multiple programs to facilitate their intranet systems.

The differences in the programs utilized were informative when considered alongside the intranet content and communication patterns. Qualitative analysis revealed that the coaching teams used the intranets in substantially different ways. Both districts used Google Drive to share instructional resources, such as curricular program resources (e.g., lesson plans, lesson resources, curricular guides), professional learning materials (e.g., slideshows, handouts, activities), assessments, best practices, and new ideas to try. However, Batali's shared drive, which mirrored their approach to instructional improvement, focused on policy fidelity, improving district programs, and diffusing information to teachers. The shared drive in Waters, on the other hand, mainly provided resources that supported professional development for the district's blended learning and personalized learning initiatives. In particular, the Waters team focused on sharing new ideas for implementing digital learning techniques.

Batali also had a highly-structured system for writing curriculum that involved teacher collaboration and consensus-building. "One of our biggest things around here," explained Batali's Team Administrator/Manager, "is the people closest to implementation should be making the decision." Prior to an adoption year, committees of teacher volunteers wrote the curriculum collaboratively. Once the district had a consensus curriculum, it became the adopted or mandated curriculum. Subsequent changes to the curriculum were then orchestrated by grade-level leaders and the instructional coaching team. Consequently, Batali's Google drive was mainly a collection of resources that helped teachers improve their teaching practice around the implementation of the core curriculum, particularly exemplar lesson plans for the mandated curriculum. In addition to Google Drive, the coaches used Rubicon, a data sharing program specific to the electronic mapping of district consensus curriculum. Any time the curriculum was updated, or "tweaked" as one district coach phrased it, coaches updated curriculum calendars on

Rubicon. The curriculum calendars mandated the scope and sequence of daily lesson content for mathematics and ELA in all grades, K-5.

In Waters, the curriculum was much more flexible. There were not mandated district curriculum maps, although there were guides to link standards to district resources. The flexibility was also advisable given the ongoing integration of digital learning, which necessitated the creation of new learning resources and the adaptation of existing lessons. For reading and writing, the district used Reading Street, but teachers could decide which lessons to teach and in which order to teach them. In mathematics, Envision Mathematics was still official curriculum, but many of the schools were piloting Eureka. As a result, there was far less curricular program coherence across school buildings. There was, however, a considerable amount of resource sharing around electronic lesson materials. The coaches managed their own building-specific folders within the Google drives.

The different intranet structures led to different kinds of team outputs. In Batali, the Google Drive and Rubicon provided efficiencies in communication and resource sharing. Because all of the schools were using the same program, the teachers could easily identify and communicate ideas and concerns about specific lessons to coaches in their building. This had a distinct advantage in terms of usefulness – shared resources were timely and relevant. In Waters, meanwhile, the Google Drive was a platform for sharing resources and ideas for implementing new policies and programs. This facilitated teacher innovation and idea sharing, but required more adaptation by instructional coaches. In Batali, teachers as well as coaches could access most of the same materials because they could be used right away. One coach from Waters described how the team used their Google drive:

> "[W]hen one of us creates something we post it. And then, I assume that everyone takes it and just makes a copy and keeps it for themselves. It's worked out really well because a lot of times when something comes up and the building needs something and we need it soon, someone probably already made something very similar that I can borrow because they've shared it with us for that exact reason. It's really nice. It's helped us a lot."

Adapting shared resources and then sharing them with the rest of the team was common practice in Waters and, to some degree, in Batali. In Batali, for example, one of the coaches started making professional development "menus," which involved giving teachers a list of options for professional development. The rest of the coaches adapted the menus to integrate into their professional development practice. Like the Waters coaches, the Batali coaches also shared a lot of professional development slides. Overall, the resource sharing process often involved "stealing" others ideas and using them in a new context – one of the hallmarks of innovation.

Finally, another major difference emerged in terms of how the intranet systems were used for communication. In Waters, there were strong team norms for using video chat programs – Zoom and Google Hangout. The administrators set the example by having Zoom meetings with coaches a few times a month. The coaches used this technology to access their transactive memory systems and learn from each other. The Batali coaches did not use video chat regularly to exchange information, preferring e-mail and text messages. In part, this was due to the high frequency of their face-to-face interactions. In Waters, the coaches did not see each other as often. In addition, the high level of program coherence in Batali mitigated the need to communicate about shared resources. In Batali, the consensus curriculum often mandated how to implement lessons requiring less explanation for using shared materials. Thus, in Batali

conversations and resource sharing revolved around improving existing curricular programs, for which they already had the know-how. In Waters, however, the coaches required more guidance for using shared materials. Here, one of the coaches describes this process:

> "You know who is an expert – I hate to use that word because we are all learners. When I hear other coaches talking about a PD they created that I think our staff could benefit from I'll see if they can spare some time on Google Hangout to walk me through the steps so I can try doing some of those things with my staff. So, we just share."

The coaches in Waters also used Twitter to facilitate learning across school buildings.

> "We use Twitter chat, which I help moderate, to learn from each other. I also try to come in with questions, especially ones I hear teachers asking. Take student goal-setting for example. We made that a Twitter chat one night where the teachers could share what they did to help students improve."

In this case, the coach was hosting a conversation about a specific practice that was common across grade-levels. Twitter chats were used often in Waters to encourage collaboration and communication across schools.

Facilitating the Formation of Collective Expertise: Developing and maintaining a transactive memory system was a complex task that included coordinating instructional resources across schools, communicating regularly with administrators and teachers, collecting data on local teacher practice, adapting program changes for district purposes, planning district-wide professional development, and leading specialized committees of educators. Critically, in both districts, transactive memory systems were dynamic and responsive to district-wide problems of practice. In this section, I describe how the coach teams identified gaps in know-

how related to district reform and solved them collectively by accessing expertise, collaborating with colleagues, and facilitating use of district intranet systems – albeit with significant differences between the districts.

In Batali, the coach team was in a constant cycle of improvement. They used their weekly meetings to identify problems of practice, plan professional development for teachers, and exchange ideas and resources. The coaches identified problems of practice by observing implementation challenges in their respective school buildings and communicating with each other. The similar-to-identical policy facilitated this process by focusing discussion. Because all of the teachers were teaching the same lessons at the same time, improvement conversations were rich. The coaching team had a common language of reform and were observing the same lessons across schools. The coaches could also anticipate problems of practice this way. For example, during one meeting the new coach was warned about an upcoming lesson on fractions that was usually difficult for students. Thus, the new coach knew ahead of time that these classrooms needed extra support, enabling her to plan her time more efficiently.

Another way the Batali coaches foreshadowed implementation problems was by co-planning and experimenting with new curricular materials before introducing it to the teaching staff. For example, the coach team wanted district teachers to adopt specific essay writing approaches they learned during their external professional development session. One of the coach team's main tasks was to improve district writing scores on the state test and the new strategies were aimed to do just that. The coaches discussed differences between the old and new approaches to essay writing at length, which led to deep discussions about what teachers would find easy/difficult, which resources would be needed, and how they should plan professional development for using the updated materials. The coaches co-planned a lesson to try out and,

during their subsequent meeting, discussed common problems they experienced. This guided their lesson planning and helped them plan district-wide professional development throughout the year.

In Waters, the Team Manager played a much more central role in augmenting information about teacher practice. During coach meetings, the Waters Team Manager spent part of the time soliciting information about ongoing struggles, as well as new ideas, across the district. For example, in one meeting several of the coaches had noticed that Kindergarten teachers in their schools were having trouble designing blended lessons for mathematics. But this was not the case in all the schools. One of the coaches informed the team that she had seen some innovative practices from her Kindergarten teachers. The Team Manager then began working with that coach and the Kindergarten teachers in her school to create resources and example lessons for blended learning in mathematics. For the next few weeks, Kindergarten teachers from across the district were released from teaching to observe and collaborate with the Kindergarten teachers. The coach was also involved and implicitly gained expertise in blended learning for Kindergarten. From that point on, the coach was recognized that way. This kind of professional development was called a teaching lab and was a common occurrence in Waters, as was the idiosyncratic allocation of instructional expertise with the district's transactive memory system. The Waters Team Manager frequently coordinated these kinds of opportunities for teachers and guided the development of expertise within her coaching team. In another example of this kind of strategizing, the Waters Team Manager worked with three coaches to develop skills in HyperDoc, which is a Google resource for digital pedagogies. The Waters Team Manager wanted the team, and teachers in general, to develop proficiency in HyperDocs and asked if a

few coaches wanted to learn the skill to teach to get the ball rolling. This kind of specialization was common in Waters, which was constantly integrating new ideas for digital learning.

More generally, specialization was an important mechanism for developing transactive memory. Building district-specific knowledge for teaching was an interdependent process in which the coaches relied on the relative expertise of their team members. But who became the expert in what topic differed significantly between districts depending on formal organizational structures and the pace of policy change. In Batali, there were formal committees of teachers organized around grade-level expertise and each coach was "assigned" to a grade level. Broadly-speaking, the coaches were responsible for developing grade-specific knowledge and skills for teaching the district's three core curricular programs. This system was conducive to Batali's incremental pace of policy change. In Waters, rather than using a pre-existing institutional structure (i.e., grade-levels), processes to organize expertise and guide the development of transactive memory depended on time-specific implementation demands.

3.6. Discussion and Conclusion

While my findings indicate there were major differences in the orientations of the district's transactive memory systems – namely Batali's system focused on improvement and achievement, while Waters focused on change and innovation – both instructional coach teams were focused on problems of practice revealing the potentially significant role these groups may have for improving district reform efforts. Past research has shown that changing teacher practice is challenging: implementing ambitious content standards and the associated transformations in instruction requires teachers to undergo extensive professional learning (Darling-Hammond & McLaughlin, 1995; Elmore, 2004; Garet, Porter, Desimone, Birman, & Yoon, 2001). While a

number of studies have demonstrated the positive impact of instructional coaching, none to date have considered the impact of coaching teams. This study shows the usefulness of this perspective. My findings indicate that coaching teams are an important lever of district reform and, especially through the augmentation of teacher innovations at the group level, can rapidly diffuse know-how and propagate system-wide reform.

My findings also provide insight into district factors that influence coaching and policy implementation. The magnitude of policy reforms for example, appears to impact how coaches support teacher instruction. In Waters, the district undergoing more significant reforms, the coaches were more focused on sharing teacher innovations and adapting instructional resources for teachers in their school. In Batali, meanwhile, where the coaches were focused on making incremental changes to existing curricular programs, the coaches were more focused on improving existing resources and maintaining fidelity to district programs. These differences were also reflected in how the district's intranet systems were organized. In Waters, the coaches used social media much more, particularly as a tool for teachers to exchange new ideas. Districts may consider supporting similar approaches to facilitate innovation around new reforms. In Batali, meanwhile, the coaches used file-sharing technologies to communicate program improvements and exemplar lessons to teachers. For districts looking to advance existing curricular programs, this approach may help diffuse and scale up improvements across schools.

Moreover, I conceptualized collective knowledge as a public good, which showed important attributes of knowledge pools that are distinct from aggregates of individual human capital. By integrating the theories of transactive memory and public goods, I show how teams can effectively share and distribute knowledge – a process aided by the extensive use of district-wide intranet systems. Overall, the introduction of intranets into district reform models may

represent the most promising addition to current theories of policy implementation. In particular, social network researchers may want to consider the impact of virtual teams and intranet connectivity in the formation of social capital. While these kinds of systems were still developing a decade ago, a new generation of educators and technological advances in file sharing and online communication appear to be significantly altering communication networks aimed at reform. Most importantly, intranets operated and maintained by local educators have the potential to dramatically alter relationships between schools, giving districts the ability to access and leverage stakeholder knowledge across the system. As educational policy shifts away from the high-stakes environment of NCLB to the more flexible and capacity-oriented framework of Every Student Succeeds Act (ESSA), districts will need to think more systematically about instructional change, and administrators and coaches would greatly benefit from more research on using intranet technology to coordinate policy implementation.

APPENDIX

Figure A.3.1. *Questionnaire items for district climate and beliefs about improvement*

1. District Climate

Professional Support for Instructional Coaching

Professional Development

- Participating in PD coach
- Participating in PD programs

Professional Collaboration

- Meet with other instructional coaches about how to support teachers
- Meet with the principal to discuss instructional strategies
- Meet with district administrators to discuss instructional programs and/or teacher instruction

Institutional Context

District-Site Collaboration

- District and school personnel in this district design instructional programs together
- This district makes an active effort to coordinate teacher instruction across grade levels and/or across content areas
- The principal, teachers and district staff collaborate to make curriculum and instruction coherent across the school district
- District staff make a considerable effort to coordinate with principals and school staff on changes in curriculum and/or instructional programs

Level of Innovation

- District officials in this school district are eager to innovate and try new ideas
- The principal(s) and school leaders I work with are constantly learning and trying new ideas
- There is too much change and innovation in this school district

2. Beliefs about Improvement

Beliefs about Data

- Student assessments are an indispensable tool for improving instruction
- Teacher evaluation data (e.g., student assessments, observations, etc.) is important for identifying professional development needs

Beliefs about Collaboration

- Improving instruction requires structured collaboration between district leaders and school staff throughout the school year
- School personnel need help to make sense of district policy goals for teacher instruction
- It is necessary to spend time talking with individual teachers to properly identify instructional issues

Table A.3.1. *Responses for district climate and beliefs about improvement*

Construct	Survey Item	Batali	Waters
Professional Development	Professional development for coaching	Everyday=0 3-4 times week=1 1-2 times week=2 1-3 times per month=3 Less than month=0	Everyday=0 3-4 times week=0 1-2 times week=1 1-3 times per month=11 Less than month=0
	Professional development for instructional programs	Everyday=0 3-4 times week=1 1-2 times week=2 1-3 times per month=2 Less than month=1	Everyday=0 3-4 times week=0 1-2 times week=0 1-3 times per month=7 Less than month=5
Collaboration	Collaborate with coaches	Everyday=0 3-4 times week=2 1-2 times week=3 1-3 times per month=1 Less than month=0	Everyday=0 3-4 times week=0 1-2 times week=0 1-3 times per month=10 Less than month=2
	Collaborate with principal	Everyday=2 3-4 times week=1 1-2 times week=3 1-3 times per month=0 Less than month=0	Everyday=0 3-4 times week=2 1-2 times week=7 1-3 times per month=3 Less than month=0
	Collaborate with district officials	Everyday=0 3-4 times week=1 1-2 times week=1 1-3 times per month=4 Less than month=0	Everyday=0 3-4 times week=0 1-2 times week=0 1-3 times per month=7 Less than month=5
District implementation context	Administrators and teachers design programs together	Strongly Agree	Agree
	District supports collaboration across grade-level/content areas	Strongly Agree	Agree
	District coordinates change with school sites	Strongly Agree	Strongly Agree
	District supports program coherence	Strongly Agree	Agree

Table A.3.2. *Batali team network densities*

Actors	Density-self	Density-other
Coach A	1.00	0.50
Coach B	1.00	0.50
Coach C	0.40	0.60
Coach D	0.20	0.63
Coach E	1.00	0.50
Coach F	0.40	0.60

Table A.3.3. *Waters team network densities*

Actor	Density-self	Density-other
Coach 1	0.14	0.28
Coach 2	0.50	0.26
Coach 3	0.07	0.29
Coach 4	0.07	0.29
Coach 5	0.36	0.27
Coach 6	0.07	0.29
Coach 7	0.14	0.28
Coach 8	0.93	0.22
Coach 9	0.57	0.25
Coach 10	0.07	0.29
Coach 11	0.07	0.29
Coach 12	0.14	0.28
Coach 13	0.64	0.24
Coach 14	0.07	0.29
Coach 15	0.21	0.28

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