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"Visible but not Noisy:" A Continuum of Secondary Mathematics Teacher Leadership

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This article reports on a study that broadens the literature on teacher leadership by talking to secondary mathematics teachers about teacher leadership. The research question that guided this study was: *How do secondary mathematics teachers define, perceive, and enact teacher leadership?* The study's findings confirmed the predominant literature that the definition of teacher leadership remained elusive. Using the sociotransformative constructivism theoretical framework, the perception and enactments of teacher leadership resulted in a teacher leader continuum and rubric describing five types of teacher leaders.

Introduction

"Visible but not Noisy" was how one American secondary[1] mathematics teacher characterised teacher leadership. Other secondary mathematics teachers developed additional positions along a continuum of secondary mathematics teacher leadership ranging from "Visible but not Noisy" to "Instigator Creating Conflict," later discussed in this article. What is interesting about these characterisations is how little people know about how teachers define, perceive, and enact teacher leadership. In America, the voices of elementary teachers have been overly represented with few studies concentrating on the voices of mathematics teachers let alone secondary mathematics teachers (Miller, Moon, & Elko, 2000; O'Connor & Boles, 1992). Yet, this lack of attention to secondary mathematics teacher leadership is alarming because if people expect secondary mathematics teachers to remain in classrooms and assume leadership roles, people must understand their thinking about teacher leadership roles. To confront this issue, this study addresses the research question: How do secondary mathematics teachers define, perceive, and enact teacher leadership?

Literature Review

Mathematics education has recently seen more concentrated thinking on teacher development (Sowder, 2007). Previously, two American-based organizations published standards detailing effective mathematics teaching and leading: the National Board for Professional Teaching Standards (NBPTS, 2008) and the National Council of Teachers of Mathematics (NCTM, 1991, 2000). The NBPTS states five core propositions describing what accomplished teachers should know and be able to do (NBPTS, 2008). The NCTM publication *Professional Standards for Teaching Mathematics* (1991) was written based on two key assumptions: teachers are key figures in changing mathematics teaching and learning and, therefore, they require sustained support and resources. Teacher leadership has been in the literature for over thirty years (Andrew, 1974; York-Barr & Duke, 2004), with mathematics teacher leadership only recently being discussed (Langbort, 2001; Miller et al., 2000).

Teacher Leadership

In the past, the term "school leader" in America referred to the principal; now, however, the term "school leadership" broadens the notion of leadership within schools to include teachers. At a time when

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[1] For this article, secondary refers to America grades 8 through 12, typically student ages 13 through 18.

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globally principals are being called to be instructional leaders, teachers are being called upon to be "high-quality teachers" (NCLB, 2001, p. 41). Yet in mathematics education, this presents a dilemma due to the shortage of high-quality mathematics teachers (Ingersoll, 2000) as well as few opportunities for professional advancement (Troen & Boles, 2003). The National Commission on Teaching and America's Future (NCTAF, 2003) describes this dilemma as a bucket full of holes, meaning as more teachers enter the profession, more teachers fall out. The teaching profession has long been a career characterized as flat and isolating with little opportunity for teachers to advance professionally without leaving the classroom (Troen & Boles, 2003). Teacher leadership, with its emphasis on diversifying teacher roles, is one avenue for minimizing these holes (Troen & Boles, 2003). "Without question teacher leadership is more important today to the success of America's schools than it has ever been before" (Pellicer & Anderson, 2001, p. 1).

Historically, most of teacher leadership literature has been more theoretical in nature and has been removed from actual classrooms and practice (Barth, 1999; Fullan, 2002; Rogus, 1988; York-Barr & Duke, 2004; Zimpher, 1988). Teacher leadership also has groundings in research on teacher professionalization (Firestone & Bader, 1992). Only recently have teacher leadership conversations moved to classrooms where teacher leaders have been profiled. Wasley (1991) conducted the first American school-based exploration. In her study, she interviewed and observed three teacher leaders and found the teacher-leader role to be complex. Since her work, others have followed in asking teachers their views (O'Connor & Boles, 1992; Huth, 2002). Across this research, several teacher leader characteristics exist: trust and relationships, political understanding, knowledge of change, and teaching and learning expertise.

Trust and building relationships are characteristics shared across the research. Teacher leaders build trust and rapport in addition to creating confidence in others (Miles et al., 1988). Shulman and Sato (2006) compiled a case collection with a theme of mentoring relationships in guiding teachers through the process of National Board Certification, a national teacher certification process in America. They discuss the highly personal nature of teaching and the difficulty in developing trusting relationships to discuss teaching practices.

In addition to trust, teacher leaders are aware of the political climate in their workplace. They understand how power and authority contribute to educational decisions (O'Connor & Boles, 1992). Teacher leaders use their political knowledge to make decisions and build relationships (Lieberman & Miller, 2004). Connected to building relationships and trust, Fullan (2002) says teacher leaders embody a sense of "moral purpose," defined as a "principled behavior connected to something greater than ourselves that relates to human and social development" (p. 2).

As change is inevitable, teacher leaders understand the impact that change can have on schools, teaching, and learning. Teacher leaders have a clear knowledge of how change happens (Fullan, 1994). They can also deal with change as well as adapt when it occurs (Miles et al., 1988; O'Connor & Boles, 1992).

Another characteristic of teacher leaders is their expertise in teaching and learning.   Teacher leaders not only understand the complexities of teaching and learning (Fullan, 1994), they also influence their peers (Katzenmeyer & Moller, 2001). They understand teaching and learning is a lifelong endeavor. Teacher leaders engage in self-inquiry and share discoveries (Lieberman & Miller, 2004; Miles et al., 1988).

Mathematics Teacher Leadership

As teacher leadership literature has grown, some researchers are concentrating on more specific forms of teacher leadership such as in mathematics. In 1991, the NCTM's publication of the *Professional Standards for Teaching Mathematics* was an attempt, as was the NBPTS, to set a national precedent in America for "good mathematics teaching" and help students, teachers, parents, administrators, teacher educators, and policy makers "see" high quality teaching. Such efforts have been put forth across the globe in England by the National Centre for Excellence in the Teaching of Mathematics in England

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(NCETM, 2007/08) and the Training and Development Agency for Schools (TDA, Professional Standards for Teachers, 2007) and in Australia by the Australian Association of Mathematics Teachers (AAMT, 2006). These publications made conversations regarding high quality mathematics teaching and leading possible.

Similar to the literature on teacher leadership, this body of literature also finds that teacher leaders must build relationships and understand change (Miller et al., 2000). More specifically, this literature focuses on the teacher leader's mathematics expertise and the mathematics classroom (Langbort, 2001; Webb, Heck, & Tate, 1996). In her list of *Who are Teacher Leaders?*, Langbort (2001) lists eighteen attributes of a mathematics teacher leader including being a mentor to other mathematics teachers, a spokesperson for mathematics education, and an active member of the mathematics education community. As active members in the mathematics community, teachers participate in self-identified professional activities and extend beyond formal professional development such as peer observation (Webb et al., 1996). Mangin (2006) studied the impact that mathematics teacher leaders (in the form of instructional coaches) had on 30 teachers in five American districts. She found that the teacher leaders participated in four main roles: providing materials, offering classroom aid, modelling lessons, and facilitating group sessions. Firestone and Martinez (2007) found that teacher leader roles included providing materials, monitoring, and developing teachers. Furthermore, the study supported previous ideas that leadership is embedded in social interaction (Spillane et al., 2004). Another study by Mangin (2007) showed that increasing communication about the teacher leader role can influence principal support for teacher leaders.

Teacher leaders must understand the complexities of change. Professional development research of mathematics teachers reveals this complexity. The Concerns Based Adoption Model (CBAM) outlines the stages that teachers experience when implementing changes (Hall & Hord, 1987; Loucks-Horsley, 1996). CBAM "applies to anyone experiencing change" and holds that "people considering and experiencing change evolve in the kinds of questions they ask and in their use of whatever the change is" such as "What is it? How will it affect me?...Is this change working for students? Is there something that will work even better?" (Loucks-Horsley, 1996, p. 89). With assumptions such as understanding the change process from the participant's view, the complexities of mathematics teacher leadership are clear.

Sociotransformative Constructivism

In teacher leadership, transformation of teachers occurs through both their own awareness of themselves as leaders and their realization that others view them as leaders. The theoretical framework used to guide the study was sociotransformative constructivism (Rodriguez, 1998). A key component in sociotransformative constructivism (sTc) ultimately, is the transformation of teachers into agents of change. Rodriguez and Berryman (2002) also highlights the idea of agency within this theory, defining agency as a "conscious role that we choose to play in helping to bring about change for the benefit of all" and the recognition of "teaching and learning as political acts" (p. 1020).

sTc has four closely connected elements: the dialogic conversation, authentic activity, metacognition, and reflexivity. The *dialogic conversation* is more complex than common dialogue and entails a much richer understanding of how each voice in a conversation works with the others to create a "context-relevant meaning" (Rodriguez & Berryman, 2002, p. 1021).An *authentic activity* is similar to authentic learning in that it is meaningful to a learner long after the "event" of learning ends. *Metacognition* is self-reflection on how one learns. It involves asking questions such as: *What am I meant to be doing? What is the purpose of the task? What control [voice] do I have in how to proceed?* The fourth element in sTc is *reflexivity*. Rodriguez and Berryman (2002) define reflexivity as the "critical process by which we explore how our social location (ethnic, cultural, socioeconomic status), ideological location (beliefs), and academic location (educational level and skills) affect our perceptions of what is worth learning" and "how we can act on new knowledge [for] social change" (p. 1022). As issues of power and authority are central in teacher leadership, it is imperative to have discussions of "how

knowledge is produced and reproduced…who decides what research is worth funding, and whose interests are served by that research" (p. 1022).

sTc provides a framework for this study because it addresses four critical areas of teacher leadership. The dialogic conversation addresses the skills teacher leaders need in communicating with student, colleagues, administrators, and policy makers in listening carefully to not only what they say, but also why and how they say it. Trust in leadership, which results from the dialogic conversation, is central to colleagues working together to affect change. Authentic activity must be meaningful to teacher leaders as well as the teachers who will be led. As is seen in research on professional development (Loucks-Horsley et al., 2003), teachers grow and practice change much more when activities are closely tied to teacher practice. Extended meaningful professional development, an authentic activity, affects change. As teacher leaders need to reflect on their own thinking, visions and goals, metacognition plays a key role in how teachers think about and act on teacher leadership. Finally, sTc provides the fourth element of reflexivity as the ability to see oneself as part of a larger cultural context. Teacher leader perceptions of how teacher leadership is enacted provide a product of how they see themselves in the social, ideological, and academic locations.

Sociotransformative constructivism provided an appropriate theoretical framework for this study because its origins began with looking at preservice teacher preparation. As teacher leaders go through another transition, preservice teacher leader preparation, sTc provides four elements from which to examine teacher definitions, perceptions, and enactments. As an ultimate goal of teacher leadership is to provide avenues for teachers to remain in the profession and improve mathematics teaching and learning, sTc offers a way to organize teachers' thinking about teacher leadership.

Methodology

This study explores the definitions, perceptions, and enactments of teacher leadership from the teacher's perspective; therefore, qualitative research methods and the focus on participants' constructions of reality were used to generate data (Miles & Huberman, 1994).

Participants

The twelve teachers in this study are recent graduates of a master's of education (M.Ed.) program at a large southeastern university in America. All remained full-time secondary mathematics teachers throughout the program. The below table provides more detail about each participant.

Procedures

Instruments and Data Collection. Four areas of data collection were (1) a teacher leader narrative, (2) a pre- and post- teacher leader survey, (3) three individual interviews, and (4) two focus groups. Data collection took place over a year, beginning in the teachers' last summer course and continuing throughout the academic year after their graduation. One year was chosen so as to follow the participants through one complete year, their first year after graduating from the M.Ed. program, to explore their thinking of teacher leadership.

Teacher Leader Narrative. In the last summer course, each teacher wrote a response to the prompt: Write a story that comes to mind when you hear the term "teacher leadership." The purpose of this first datum is to explore how the teachers, prior to the course, conceptualize and describe teacher leadership.

Teacher Leader Survey. In the middle of the summer course (pre-) and end of the study (post-), teachers completed a teacher leader survey (Center for Teacher Leadership, 2003). The pre-survey's purpose was to gather data on teacher demographics, areas of teacher leadership participation,

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challenges, and current definitions. The purpose of the post-survey was to learn what new teacher leader roles, if any, they participated in throughout the year and to allow them a final opportunity to articulate their teacher leadership definition.

Individual Interviews. During the academic year, three individual interviews were conducted: one in the beginning, middle, and end of the year. The first interview asked general questions about teaching backgrounds and moved to more specific questions about teacher leadership. Data gatheredfrom each interview was used to develop subsequent interview protocols with the intention of growing more specific. The purpose of each interview was to monitor teachers thinking about teacher leadership, if those views change, and how their enactment occurred throughout the year.

Focus Groups. Two focus groups were held to allow participants to reconnect with classmates in a discussion around teacher leadership. Each of the two focus groups was held in between the series of three interviews.

Trustworthiness. Various procedures were employed to insure the trustworthiness of the findings. Triangulation was used to compare multiple data sources (Lincoln & Guba, 1985). For example, responses from first interviews were triangulated with the second two interview responses, focus group responses, teacher leadership narratives, and pre- and post-survey responses. The second technique used was peer debriefing. An external reviewer critically reviewed the study report throughout the data collection and analysis process. Member checking was used as a third technique. Interview transcripts were emailed to every participant to allow them to reread their words to ensure they had conveyed their thinking clearly. Finally, the final report was emailed to all participants to ensure the researcher had accurately captured their voices.

Data Analysis
Data analysis was an ongoing and iterative process throughout and following data collection (Coffey & Atkinson, 1996; Noblit, 2005). The seven-phase data analysis is briefly described in the table below. All data was tallied and coded numerous times; each phase of analysis built on the preliminary findings from the previous phase.

Following Phase 2 of data collection, similarities in participant definitions of teacher leadership emerged. However, a difference in the way teachers perceived these definitions was seen from Dinah who described teacher leadership as "visible but not noisy" to Debra who saw teacher leadership as a possible "both/and" rather than an "either/or" (Griffin, 2002). Debra wrote:

> One side of me, when I was listening to our instructors encouraging us to be teacher leaders, I think in the back of my mind, they are encouraging us to be instigators and I think about trouble maker and I kind of wish it wasn't like that because in my own view, I'd like to think of teacher leaders as somebody who is helpful to other teachers and students, somebody who attempts to do good things like implement new programs that are beneficial. So I guess one side of me sees teacher leaders as someone who complains and wants to change everything about the school and then somebody else on the other hand, teacher leader being somebody who wants to improve and do good for the school. So probably a true teacher leader is somebody who is in between so you would have the gumption to stand up and complain when things are not right but not just always be a complainer. (Debra, Interview 1)

Based on the research question, each code was categorized as addressing the definition, perception, or enactment of teacher leadership. Based on the sTc elements, each code was also categorized as the dialogic conversation, authentic activity, metacognition, or reflexivity. The vignettes of each teacher were reread several times looking for consistencies among the teachers, their definitions, perceptions, and enactments, and the four sTc elements. From our yearlong conversation and data analysis, a teacher

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leader continuum emerged and will be discussed in further detail later. The idea of this continuum was presented for participant reaction and critiques repeatedly. The continuum proved to be a central theme throughout the year constantly revisited and refined.

Regarding the continuum, it is imperative to make three initial key points. First, the continuum is not hierarchical; one position along the continuum is not better than another. Secondly, the continuum is "situational." Whereas a teacher may typically fall on one position along the continuum, situations may arise that causes the teacher to move to another position. Third, "noisy," "instigator," and "conflict" usually have negative connotations. The reader is asked to suspend those negative connotations. Great thought and discussion surrounded the decision to maintain these words in the continuum headings. While less potent words were considered, I decided to return to these words, the original words of the teachers, to maintain data integrity.

Findings: Continuum and Rubric

The Teacher Leader Continuum spans five positions (framed by the participants). The rubric spans two areas (framed by the research question) and four elements (framed by the sTc. The continuum extends from Visible but not Noisy to Instigator Creating Conflict. The middle three positions are Visible with Noise, Noisy without Conflict, and Instigator with Conflict. The rubric addresses two areas from the research question: perception and enactment and the four elements of the sTc: the dialogic conversation, metacognition, reflexivity, and authentic activity. The continuum and rubric is graphically presented below (Figure 1) including the participant positions along the continuum. Important to note is that although the Figure 1 appears neatly divided into static, distinct cells, all cells are interconnected and fluid.   The Teacher Leader Continuum Rubric is the major finding and theme from this research.

Visible but not Noisy

Visible but not Noisy teachers tend to be new to their schools, trying to find their place. They see themselves as part of a larger group and mention other colleagues as teacher leaders. These teachers like to be "behind the scenes" working within their schools to guide teachers curricularly (NCSM, 2008).

Perception. Four of the five teachers in this position were teaching at new schools and felt they had to earn respect, acceptance, and trust (Miles et al., 1988). "There are all these things on the burner and they have the potential but I am hesitant because I am brand new on the block. I have to earn a little respect" (Ciara, Interview 2). Different from her previous school, Ciara's new school does not use calculators. She is working to set an example by using calculators in algebra yet not create barriers by saying, "Where I come from, we do it this way."

Teachers saw themselves as a part of a larger group and often spoke of others as teacher leaders. Hannah believes teacher leadership happens in a larger setting; it is not an individualistic activity. Like Hannah, Bev sees herself as part of a larger group. She leads a team of geometry teachers, but emphasizes her role as a part of the larger group.

Enactment. While seeing themselves as part of a larger group, these teacher leaders enact leadership from behind the scenes. "I'm usually the person putting it all together for somebody else to do" (Bev, Interview 2). Hannah, with 35 years of experience, is at a new school involved in a project that will "last past me." Her experience has taught her the "great power of sitting and listening" (Interview 3).

For these teachers, enactments involved guiding colleagues curricularly (NCSM, 2008). Miles served as the algebra "guru." As part of his role, Miles reflected on his own work in algebra before the group met as a whole to discuss best practices (Interview 3). Like Miles, Oliver wants to create a curricular study group.

Visible with Noise

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The next position along the continuum is Visible with Noise. Teachers are not new to their school but prefer to be quiet. These teachers will speak up, however, if they feel strongly about the topic. They want to be involved in teacher leadership but often feel it "pulls them away from" their teaching responsibilities. These teachers say others see them as teacher leaders, which in turn, makes them consider themselves as teacher leaders. Like teachers who fall into the previous position, they guide teachers curricularly (NCSM, 2008).

Perception. The Visible with Noise teachers remain quiet but will speak up if forced. Sally's role as department chair changed from being less administrative to more instructive. Sally spoke of feeling both quiet and having voice. "I am more quiet than I should be, sometimes. Sometimes, I'm not. I just have to feel comfortable in a situation" (Interview 2). Like Sally, Debra considers herself quiet, "the teacher leader activities I do are more on the quiet side like mentoring" (Focus Group 2). However, when she feels forced on an issue like an unacceptable school improvement plan, Debra evidenced she also has a voice by petitioning her colleagues to vote against it. Sally and Debra's comments also support the situational nature of the continuum.

Teachers want to be involved in teacher leadership but feel it "pulls them away from" teaching. Dinah and Sally lose planning time when leading; Dinah spends "more time doing this peripheral stuff than I do preparing to teach my classes" (Focus Group 2). Surprisingly, Debra, saw her work on a national certification, seen as a prominent teacher leader activity, as "taking away" from teaching. "I felt National Boards hindered my teaching….I think it took time away from time I could have been planning and being a better teacher" (Interview 3).

Enactment. Teachers wrote and spoke about themselves and others as teacher leaders. As the year began, Debra was "not sure" she considered herself a teacher leader, believing others did not either. At year's end, she did see herself as a teacher leader and others saw her as one also. Like Debra, Anna began the year saying she was not a teacher leader (however, in the pre-survey she did consider herself a teacher leader). Consequently, Anna and Sally spoke of considering themselves teacher leaders because others thought they were.

Like the teachers in the previous position, teachers in this position also enact teacher leadership by guiding teachers curricularly (NCSM, 2008). Sally leads several curricular groups. Debra guides teachers more individually serving as a mentor and helping teachers earn national certification.

Noisy without Conflict

Teachers in this position use their voice consistently and are strategic in garnering support (Barth, 1999). Sensitive to different perspectives, colleagues appreciate their balanced views. They ensure that individuals in power hear their voice. These teachers represent colleagues at the school and district level.

Perception. Bess was the only teacher in this position. Having been at her school for several years, Bess is "diplomatic in garnering support." She "tend[s] to be a little bit more visible, a little bit more loud" (Interview 2). Bess credits her success to her longevity and ability to be trusted. "I think some of that [teacher leadership] has just been over time…. I think some of it came after I have stayed in the building; I'm not going anywhere" (Bess, Interview 2). Although teachers in this position have their own opinions, they are sensitive to different perspectives. Bess listens to differing opinions and represents those to outsiders:

> This [teacher leadership] obligates us, as educators, to remain open-minded about new ideas and practices and thoughtful, even critical of our current ideas and practices in order to see ourselves as we really are….Even though positive growth can be painful and uncomfortable at times, if we are to become teachers who make a profound difference on the next generation, we must reform the areas that need improvement and refine what is already good. (Narrative)

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Enactment. Teachers ensure powerful people hear their voices. By serving on administrative teams, Bess is afforded interactions with people at different hierarchical levels. She is determined to be heard by the superintendent. "You have to vie for his attention and I do. I dominate that meeting a lot of times." (Interview 3). Although Bess guides teachers curricularly (e.g. working with student teachers), her leadership enactments this year are more school and district level policy making. By year's end, Bess recognised the impact both her leadership in and out of the classroom had on her teacher leadership enactments.

> In the past [I] always said all this other stuff on the outside was teacher leadership and not thought so much about my role in the classroom but the longer I've been in the classroom, the longer I've been a teacher, the more I realise how powerful and important just being in the classroom is too. …I think it is important not to devalue the classroom part. That is just as important as the outside stuff. (Focus Group 2)

Instigator with Conflict

The next position is Instigator with Conflict. Teachers are not afraid of being labelled loud but aware of the attached stigma. They feel a newfound sense of agency and responsibility to improve teaching and learning (Rodriguez & Berryman, 2002). Teachers will stand against a harmful action as well as support a beneficial one. They work to protect teachers and students against unfair policies and curriculum.

Perception. The teachers in this position (Mitch and Jim) have been at their school for several years and are not afraid of being labelled loud. Jim "definitely think[s] I am on the louder less passive end" (Interview 2). However, they are aware of the stigma attached. Mitch and Jim address conflict when their views differ from others. Jim's persistence has been evident in three situations where he exhibited advocacy. In one situation, Jim dealt with his district's not wanting to reimburse teachers.

> Finally got it all approved. Paperwork is done…. We've got things worked out. If nothing else, they know me by name over there. Now they know I might as well just answer his calls. (Interview 1)

Mitch recognizes that "you wrinkle some feathers" with teacher leadership.

> Obviously when you become a teacher leader, you are making yourself more vulnerable to criticism because you sometimes are put in positions where you have to express your opinions and those are not opinions shared by everybody. …And those are the times when you wrinkle some feathers because everybody—I don't know anybody who doesn't get into teaching that doesn't have an opinion about something. (Mitch, Interview 1 & 2)

Agency and responsibility also characterise a teacher leader in this position (Rodriguez & Berryman, 2002). Jim and Mitch spoke of their newfound agency and subsequently, the responsibility to be change agents.

> You take for granted, you have mentored, you are doing leadership things helping people out but you are not bringing any cause. No one is rallying me to say I need to take a stand for this or we need to walk out here….I think that [continuum] is right on. And I think I would have been on the lower, less vocal end, even prior to the programme just not even thinking about it. I would do things and help but not really think about it. Now, I have become much more irritant on the other end of speaking. I have no problem throwing my name if I think it is something worth throwing out there. (Interview 2)

Enactment. Teachers in this position stand against an action seen as harmful to teachers and students as well as support an action they see as beneficial. On the beneficial side, Mitch agreed to sponsor a student-founded crafts group if the crafts were created for a local retirement home. However, on

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the harmful side, Jim is collecting data in support of a mathematics department member being unfairly targeted by the administration. "I decided we are standing up for this teacher in our department and she is being railroaded and so the first thing we figured we could do is provide a mathematical analysis to show that she is not in the bottom" (Jim, Interview 2).

Teachers work to protect teachers and students from unfair policies. When Mitch was concerned about an extended school day, he sent a faculty email, held a student discussion, and attended a board meeting. Like Mitch, Jim felt the need to become involved when his students may be in danger of not graduating. "I don't know who is the advocate for the kids; I guess that is us" (Jim, Interview 3).

Instigator creating Conflict

The fifth and final position along the continuum is the Instigator creating Conflict. This teacher is proud of being labelled loud and unconcerned with the attached stigma. They perceive themselves as a teacher leader. These teachers are not largely *reactive* like an Instigator with Conflict, but rather *create* a cause. Finally, like an Instigator with Conflict, these teachers work to protect teachers and students from unfair policies.

Perception. No teachers in this study found themselves at the right extreme of the teacher leader continuum; however, based on the data, a fifth position existed. Although no teachers fell in this position, they spoke of teachers who would. As the data was analysed, Jim and Mitch sometimes found their way to this fifth position. The key difference between the fourth and fifth position is that teachers are more *reactive* in the fourth and more *proactive* in the fifth. In the fourth position, teachers deal with actions already in existence. In the fifth position, teachers create causes based on their own passions. The decision to place Jim and Mitch in position four was based on this key difference. Jim and Mitch were advocating against pre-existing conflicts rather than creating causes of their own. An Instigator creating Conflict is proud to be labelled loud and not necessarily a long time faculty member. In fact, their tendency to create change may necessitate their periodically moving schools.

Teachers in this position consider themselves teacher leaders and act. These teachers create causes motivated by their passions. Some participants referred to these teachers as "activists" or, as Debra did initially, as "instigators" perceiving teacher leadership as two-sided, one positive and one negative. As the study continued, she continually re-evaluated her perception.

Enactment. Teachers see themselves as active participants in the hierarchical locations. Based on their passions, they create causes to improve education. Whereas teachers in the Instigator with Conflict position often deal reactively with issues, teachers in this position are proactive. For example, a teacher or group of teachers may believe creating a lesson study group would improve instruction and camaraderie (Bass et al., 2002). Therefore, they create the structure (e.g. meeting times, class observations) allowing this implementation to occur. This instance provides an example where a teacher in the Visible but not Noisy, Oliver, finds himself in the Instigator creating Conflict position for this situation. Oliver's work to form a lesson study group exhibits the continuum's situational nature.

Teachers who fall into the fourth and fifth positions work to protect teachers and students from unfair policies. Like Jim and Mitch, teachers protect against unfair policies in the state and district, and possibly national level. For example, two teacher leaders discussed by participants believe strongly in their curriculum. Therefore, they researched student learning and presented their findings to a national committee researching mathematics education in America.

Discussion

This section offers a summary of the study, implications, trustworthiness and limitations, implications, and directions for future research. The summary of the study reviews the purpose, the methodology, and the findings. Next, study limitations are discussed. Then, global implications for

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teachers, administrators, and teacher educators are presented. Finally, I conclude with directions for future research.

Summary

The purpose of this study was to investigate the definitions, perceptions, and enactments of teacher leadership from the perspective of secondary mathematics teachers. I began the study with the research question "How do secondary mathematics teachers define, perceive, and enact teacher leadership?" This question remained the guiding question throughout the study. The goal was to include the voices of teachers in the operationalization of the phrase teacher leadership, and specifically, the voices of secondary mathematics teachers. The sTc theoretical framework provided both a research tool to analyze the data as well as a presentation tool to organize the data.

The findings showed that while most teachers began the year with the same definition of teacher leadership, they ended the year with much broader, less certain definitions. I was initially surprised at the definition similarity as the literature was clear that teacher leadership definitions were typically ambiguous (Murphy, 2005). I believe this similarity was a result of their all graduating from the same M.Ed. programme. As the year progressed, however, teachers became more aware of the complexities of teacher leadership and their definition changes reflected that awareness.

Unlike the definition similarities, perceptions and enactments of teacher leadership proved more diverse. Soon after the first interview, a continuum became apparent where the teacher discussions of perceptions and enactments tended to fall. Much of the remainder of the year of data collection and analysis was spent with the teachers working to refine the continuum. Teacher perceptions of teacher leadership began with the perception that part of teacher leadership was remaining in the building for longer than two years. At the other end of the continuum, teachers perceived teacher leaders as those who not only were tenured faculty, but also faculty who would voice their opinions, loudly if necessary. Teacher perceptions of teacher leadership along the continuum began with seeing themselves as a part of a larger group of teacher leaders and feeling more like a teacher leader when others saw them as teacher leaders.

The other extreme, however, on the continuum not only perceives themselves as a teacher leader, but also feels the responsibility to act. That responsibility to act leads to the enactment of teacher leadership. On the left side of the continuum, teachers would rather lead from behind the scenes. As the continuum progresses towards the right, teacher enactments become more apparent and noisy. Teachers have a passion for a cause, such as a mathematics curriculum they believe is best for students, and become a driving force towards ensuring that curriculum's implementation. Lastly, teacher enactments reflect the work and scope of their activities. Teachers on the left side of the continuum tend to work more in their schools guiding teachers curricularly, for example, as the geometry course lead teacher. Moving further along the continuum, teacher enactments expand to outside their schools into their counties and districts, for example, serving on the district superintendent's advisory council or collaborating with teachers across the state to offer appropriate mathematical courses to students who have advanced past the typical high school offerings.

The sTc provided the organisational tool to further understand the data. As the sTc was originally used to better understand pre-service teacher development, this study used it to better understand in-service teacher leader development. The last two components of the research question (perception and enactment) were further explained by the dialogic conversation, metacognition, reflexivity, and authentic activity. Through these four elements, the teachers' lived experiences were more deeply understood across the continuum. With regard to the dialogic conversation and metacognition, teachers more specifically spoke of longevity and trust and agency and responsibility, respectively. With regard to reflexivity and authentic activity, teachers spoke more specifically about power and influence and work and scope, respectively.

One point of interest from the findings that must be mentioned is related to gender. The two individuals who fall on the right end of the continuum, Mitch and Jay, are both male. Differences in

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gender and leadership have been noted (Bass et. al, 1994; Bass et. al, 1996; Parker, 2005). Although differences are small, significant differences do exist. In a meta-analysis conducted by Eagly and Johannesen-Schmidt (2000), a review of literature comparing male to female leadership styles found that "most differences were relatively small, but there was a tendency for women to be more interpersonally oriented, less autocratic, and more participative" (Avolio et. al., 2004, p. 283). Bass et al. (1996) also found that women were rated as more transformational than their male equivalents. This study supports these previous findings, as the women in this study tended to be more relational and less autocratic whereas the men tended to be more instigative. However, it is important to point out that the other two male participants, Oliver and Miles, fell into the visible but not noisy position.

Limitations

Four limitations of the study are noted and described in further detail below. The first limitation that is also an advantage is the two-year relationship the researcher had with the participants upon beginning the study. Each participant had been a member of a cohort of graduate students with whom she had worked. The limitation is that having been with the participants for such an extended period, the researcher has formed relationships and opinions. In caring for each participant, she may have an "idealised" view of them or a "protector" stance around wanting to keep them safe that may interfere with her objectivity towards the data. The advantage is that being with the participants for such an extended period, the researcher has formed relationships and opinions. The participants already knew and trusted her. The participants and the researcher have spent time in classes and in dialogue, both written and verbal, so the researcher was familiar with the participants as individuals as she began her work.

Some researchers have acknowledged the imperfection of self-reporting (House, Shane, & Herold, 1996; Morrison, 1994). I do not argue that just as pencil-and-paper and human instruments are imperfect, so too are human reporters. Being objective about oneself is probably just as unattainable as a perfect data collection tool when it comes to understanding and perceptions. However, the goal of my study is to listen to how *teachers* define, perceive, and enact teacher leadership, so self-reporting is not only unavoidable, but also the basis of my study.

A third limitation comes in the form of implicit theory (Rosenburg & Jones, 1972). The implicit theory, such as Glesne (1999) discusses, recognizes the power dynamic in the research process. As one is deemed the researcher and the other is deemed the researched, the researcher is seen to be "looking for something" or "holding all the answers" and the researched implicitly feels that he/she must help the researcher find what he/she is looking for or offer the "correct answers" to the researcher. When the participants become preoccupied with wanting to be as helpful as possible to the researcher or afraid of giving the wrong answers, that preoccupation may distract them from simply answering interview questions honestly.

Finally, given the nature of qualitative research, the mathematics teachers with whom the researcher worked are a convenience sample in the sense that they are all graduates of the same program at the same university. The findings of this study will be specific to their experiences and therefore, cannot be generalized to other groups.

Implications

As the pressure for improved mathematics teaching and learning grows internationally, teacher leaders are being called to step forward (AAMT, 2006; NCEE, 1983; NCETM, 2007/08; NCLB, 2001). In order for teachers to meet this call, teachers must better understand teacher leadership. Similarly, administrators, and teacher educators must also better understand it. Others have offered helpful teacher leader continuums that address teachers from across content areas (Lambert, 2003). Some have begun to look more closely at how content areas affect teacher leadership (Sato, 2002).

Unlike Lambert's continuum with the goal of all teachers moving to its right extreme, this continuum merely describes teacher leaders in their current position. Like Lambert's continuum, the Teacher Leader Continuum Rubric advances the literature by involving teacher voices and understandings

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into the development of the field. This continuum rubric allows teachers, administrators, and policy makers to determine the landscape of teacher leaders in their schools and utilize their strengths to improve the teaching and learning of mathematics. For example, if the head of a secondary mathematics department is searching to fill a teaching position, she or he can use the continuum to assess what type of teacher leaders are already present in the mathematics department. Then, potential candidates for the position can be screened to match the type of teacher leader needed in the department. With this type of staffing consideration, teacher leaders within a mathematics department can be better balanced and more time can be spent on improving the teaching and learning of mathematics rather than on administrative tasks that do not match their strengths (as described in the continuum). If a mathematics department has, for example, a Visible but not Noisy teacher leader as well as an Instigator Creating Conflict teacher leader, than the Visible but not Noisy teacher leader does not have to expend excess energy trying to combat unfair student policies when the Instigator Creating Conflict teacher leader is more comfortable in doing so. Therefore, the Visible but not Noisy teacher leader can utilize that energy for the teaching and learning of his/her students.

Furthermore, this study offers a teacher leader continuum for mathematics teacher leaders. It used the voices of mathematics teachers to provide concrete examples of secondary mathematics teacher leadership. Through a better understanding of mathematics teacher leadership, teachers can assume leadership roles globally.   Administrators can better articulate to teachers what their expectations are for teacher leaders. With a concrete continuum and rubric that names and states specifically the characteristics of each type of teacher leader, administrators have a document to which they can refer when assessing their current mathematics departments. Through conversations with teacher leaders, they can determine what strengths currently lay in that department. Guided by the common language and specificity of the rubric, teacher leaders and administrators can work to better develop teacher leaders within the department and better staff the department for teacher leadership balance when positions become available. Similarly, teacher educators can better prepare pre-service mathematics teachers to become teacher leaders. With the document creating a concrete model for discussion, teacher educators can discuss and create case studies with teacher candidates to help them see opportunities for teacher leadership. With these discussions occurring earlier in the preparation of mathematics teachers, teachers have the potential to develop as teacher leaders earlier in their careers.

Direction for Future Research
While this study begins to answer the question of how teacher leadership looks with respect to secondary mathematics teachers, there is still much to be learned. The teachers determined that teacher leadership was "not an absolute", but was heavily dependent on the situation. Much like pre-service teachers going through a process to become teachers, in-service teachers experience a process in becoming teacher leaders. Based on these findings, future research that continues to involve mathematics teachers globally in understanding this process is needed. As the teaching and learning of mathematics in America is in crisis with under qualified mathematics teachers in classrooms, more research is needed on how to build mathematics teacher leaders, support them in the classroom and help them cultivate other highly qualified mathematics teachers (Copland & Knapp, 2006). Ultimately, research in mathematics teacher leadership needs to be connected internationally to student achievement and answer the questions: "What skills do mathematics teacher leaders need in order to improve the teaching and learning of mathematics for all students? How does the support of mathematics teacher leaders impact student achievement?"
A second area of future research would be to better illustrate the difference between a mathematics teacher leader and another content area teacher leader. The teaching of mathematics is a unique endeavour and requires a specific skill set (NCTM, 1991). In the current American educational environment, the high stakes testing of mathematics also places a level of responsibility on mathematics teacher leaders. Mathematics teacher leaders in a school that earns high test scores may look different

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than their counterparts in a school that earns low test scores. Future research is needed to determine how these differences affect mathematics teacher leaders. This continuum seems to be applicable to other content areas, not solely mathematics. Some may also argue the continuum is merely describing personality differences which are manifested in particular settings. However, some may also argue that secondary mathematics teachers have different personality types resulting in a content specific continuum. Further research needs to be done to tease out these nuances and gain even more specificities towards mathematics teacher leaders. Also, because the fifth category was an extrapolation based on participant data and no participants from this study fell in that category, more research needs to be done to determine the strength of that category.

Mathematics teaching and learning look different around the world; however, strong mathematics education is a desire of many countries (Even, 1999; Sowder, 2007; Stigler & Hiebert 1999). This continuum helps mathematics educators think more deliberately about who mathematics teacher leaders are, how to develop them, and how best to use their expertise to improve mathematics education for all students.

Role of Funding Source

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References

Andrew, M. D. (1974). *Teacher leadership: A model for change. Bulletin 37*. Reston, VA: Association of
     Teacher Educators.

Avolio, B.J., Sosik, J.J., Dong, I.J. & Berson, Y. (2004). Leadership models, methods and applications. In
     W. C. Borman, D. R. Ilgen, & R. J. Klimoski (eds). *Handbook of Psychology,Volume 13, Industrial
     and organizational psychology* (pp. 277-315). New Jersey: Wiley.

Australian Association of Mathematics Teachers Inc. (2006). *Standards for excellence in teaching
     mathematics in Australian schools.* Retrieved on July 15, 2008, from
     http://www.aamt.edu.au/Standards/Standards-document/AAMT-Standards-2006-edition

Barth, R. S. (1999). The teacher leader. *Phi Delta Kappan, 82*(6), p. 443-449.

Bass, B. M., & Avolio, B. J. (1994). Shatter the glass ceiling: Women may make better managers. In K.
     Grint (Ed.) (1997), *Leadership: Classical, contemporary, and critical approaches* (pp. 199-210).
     New York: Oxford University Press.

Bass, B. M., Avolio, B. J., & Atwater, L. (1996). The transformational and transactional leadership of
     men and women. *Applied Psychology: An International Review, 45,* 5-34.

Bass, H., Usiskin, Z. P., & Burrill, G. (Eds.) (2002). *Studying classroom teaching as a medium for
     professional development: Proceedings of U.S.–Japan Workshop.* Washington, DC: National
     Academies Press,

Bogdan, R. C. & Biklen, S. K. (1982). *Qualitative research for education: An introduction to theory and
     methods*. Boston, MA: Allyn & Bacon.

Center for Teacher Leadership. (2003). *Teacher leader survey.* Richmond, VA: Center for Teacher
     Leadership.

Coffey, A. J., & Atkinson, P. A. (1996). *Making sense of qualitative data: Complementary research
     strategies.* Thousand Oaks, CA: Sage Publications.

Copland, M. A. & Knapp, M. S. (2006). *Connecting leadership with learning: A framework for reflection,
     planning, and action*. Alexandria, VA: Association for Supervision & Curriculum Development.

Eagly, A.H. & Johannesen-Schmidt, M.C. (2001). The leadership styles of women and men. *Journal of
     Social Issues, 57*(2001), 781-797.

Even, R. (1999). The development of teacher leaders and inservice teacher educators. *Journal of
     Mathematics Teacher Educator, 2*, 3-24.

Firestone, W. A. & Bader, B. D. (1992). *Redesigning teaching: Professionalism or bureaucracy*. Albany,
     NY: State University of New York Press.

Firestone, W. A. & Martinez, M. C. (2007). Districts, teacher leaders, and distributed leadership:
     Changing instructional practice. *Leadership and Policy in Schools, 6*(1), 3-35.

_____

Fullan, M. (1994). Teacher leadership: A failure to conceptualize. In D.R. Walling (Ed.), *Teachers as leaders: Perspectives on the professional development of teachers* (pp. 241-253). Bloomington, IN: Phi Delta Kappa Educational Foundation.

Fullan, M. (2002). Moral purpose writ large. *The school administrator.* The Association of School Administrators. Retrieved October 2, 2005, from http://staging.aasa.rd.net/ publications

Glesne, C. (1999). *Becoming qualitative researchers: An introduction.* New York, NY: Longman.

Griffin, D. (2002). The emergence of leadership: Linking self-organization and ethics. *New York: Routledge.*

Hall, G. E. & Hord, S. M. (1987). *Change in schools: Facilitating the process.* New York: State University of New York Press.

House, R. J., Shane, S. A., & Herold, D. M. (1996). Rumors of the death of dispositional research are vastly exaggerated. *Academy of Management Review, 14*, 385-400.

Huth, M. D. (2002). *Teacher perspectives on teacher leadership.* (Doctoral dissertation, University of North Carolina at Chapel Hill, 2002). *Dissertation Abstracts International, 63* (3)*,* 906. (UMI No. 3046407).

Ingersoll, R. M. (2000). *Turnover among mathematics and science teachers in the U.S.* Prepared for the National Commission on Mathematics and Science Teaching for the 21st Century. Retrieved December 15, 2007, from http://www.ed.gov/inits/Math/glenn/Ingersollp.doc

Katzenmeyer, M. & Moller, G. (2001). *Awakening the sleeping giant: Helping teachers develop as leaders (2nd ed).* Thousand Oaks, CA: Corwin Press.

Lambert, L. (2003). *Leadership capacity for lasting school improvement.* Alexandria, VA: Association for Supervision and Curriculum Development.

Langbort, C. (2001). The professional development of effective teacher leaders. In C.R. Nesbit, J.D. Wallace, D.K. Pugalee, A. Miller, & W.J. DiBiase (Eds.), *Developing teacher leaders: Professional development in science and mathematics* (pp. 245-266). Columbus, OH: ERIC Clearing house for Science, Mathematics, and Environmental Education. (ERIC Document Reproduction Services No. ED451031).

Lieberman, A. & Miller, L. (2004). *Teacher leadership*. San Francisco, CA: Wiley & Sons.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. New York: Sage.

Loucks-Horsley, S. (1996). Professional development for science education: A critical and immediate challenge. In R. Bybee (Ed.), *National standards and the science curriculum.* Dubuque, IA: Kendall/Hunt Publishing.

Loucks-Horsley, S., Love, N., Stiles, K. E., Mundry, S., & Hewson, P. W. (2003). *Designing professional development for teachers of science and mathematics.* Thousand Oaks, CA: Corwin Press.

_____

Mangin, M. M. (2006). Teacher leadership and instructional improvement: Teachers' perspectives. In W. Hoy & C. Miskel (Eds.), *Contemporary issues in educational policy and school outcomes*. Greenwich: CT: Information Age Publishing.

Mangin, M. M. (2007). Facilitating elementary principals' support for instructional teacher leadership. *Educational Administration Quarterly, 43*(3), 319-357.

Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis (2nd ed)*. Thousand Oaks, CA: Sage Publications.

Miller, B., Moon, J., & Elko, S. (2000). *Teacher leadership in mathematics and science: Casebook and facilitator's guide*. Portsmouth, NH: Heinemann.

Morrison, E. W. (1994). Role definitions and organizational citizenship behavior: The importance of the employee's perspective. *Academy of Management Journal, 37*(6), 1543-1567.

Murphy, J. (2005). *Connecting teacher leadership and school improvement.* Thousand Oaks, CA: Corwin.

National Board for Professional Teaching Standards. (2008). *What teachers should know and be able to do: The five core propositions of the National Board*. Retrieved on March 31, 2008, from http://www.nbpts.org/the_standards/the_five_core_proposition

National Centre for Excellence in the Teaching of Mathematics. (2007/08). *Annual report*. Retrieved on July 15, 2008, from http://www.ncetm.org.uk/files/273183/NCETM+Annual+Report+2007_08.pdf

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, D.C.: Author.

National Commission on Teaching and America's Future. (2003). *No dream denied: A pledge to America's Children (Summary Report).* Washington, DC: National Commission on Teaching and America's Future.

National Council of Supervisors of Mathematics. (NCSM, 2008). *The PRIME leadership framework: Principles and indicators for mathematics education leaders*. Bloomington, IN: Solution Tree.

National Council of Teachers of Mathematics. (1991). *Professional standards for teaching mathematics.* Reston, VA: Author.

National Council of Teacher of Mathematics. (2000). *Principles and standards of school mathematics.* Author: Reston, VA.

No Child Left Behind (NCLB). (2001). *No child left behind: Executive summary*. Retrieved April 2, 2005, from http://www.whitehouse.gov/news/reports/no-child-left-behind.html#4

Noblit, G. (2005). Personal communication.

_____

O'Connor, K. & Boles, K. (April, 1992). *Assessing the needs of teacher leaders in Massachusetts.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. (ERIC Document Reproduction Services No. ED348770).

Parker, P. S. (2005). *Race, gender, and leadership: Re-envisioning organizational leadership from the perspectives of African American women leaders*. Mahwah, NJ: Lawrence Erlbaum.

Pellicer, L. O. & Anderson, L. W. (2001). Teacher leadership: A promising paradigm for improving instruction in science and mathematics. *Science, Mathematics, and Environmental Education.* (ERIC Document Reproduction Services No. ED465586).

Rodriguez, A. J. (1998). Strategies for counterresistance: Toward sociotransformative constructivism and learning to teach science for diversity and for understanding. *Journal of Research in Science Teaching, 35*(6), 589-622.

Rodriguez, A. J. & Berryman, C. (2002). Using sociotransformative constructivism to teach for understanding in diverse classrooms: A beginning teacher's journey. *American Educational Research Journal, 39*(4), 1017-1045.

Rogus, J. F. (1988). Teacher leader programming: Theoretical underpinnings. *Journal of Teacher Education, 39*(1), 46-52.

Rosenberg, S. & Jones, R. A. (1972). A method for investigating a person's implicit theory of personality: Theodore Dreiser's view of people. *Journal of Personality and Social Psychology, 8*, 128-138.

Sato, M. (2002). *Practical leadership.* (Doctoral dissertation, Stanford University, 2002). *Dissertation Abstracts International, 63* (04)*,* 1307. (UMI No. 3048610).

Shulman, J. H. & Sato, M. (Eds.) (2006). *Mentoring teachers towards excellence*. San Francisco, CA: West Ed and Jossey-Bass.

Sowder, J. T. (2007). The mathematical education and development of teachers. In F. K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 157 – 223). Charlotte, NC: Information Age.

Stigler J. M. & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom.* New York, NY: Free Press.

Spillane, J., Halverson, R. & Diamond, J. B. (2004). Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies, 36*(1), 3-34.

Training and Development Agency for Schools. (2007). *Professional standards for teachers: Why sit still in your career?* Author: London, England. Retrieved July 29, 2009, from tda.gov.uk/upload/resources/pdf/s/standards_a4.pdf

Troen, V., & Boles, K. (2003). *Who's teaching your children: Why the teacher crisis is worse than you think and what can be done about it?* New Haven, CN: Yale University Press.

Wasley, P. (1991). *Teachers who lead: The rhetoric and reform and the realities of practice.* New York, NY: Teachers College Press.

_____

Webb, N. L., Heck, D. J., & Tate, W. F. (1996). The urban mathematics collaborative project: A study
    of teacher, community, and reform. In S. A. Raizen & E. D. Britton (Eds.), *Bold ventures: Case*
    studies of U.S. innovations in mathematics education (Volume 3). Boston: Kluwer Academic
    Publishers.

York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two
    decades of scholarship. *Review of Educational Research, 74*(3), 255-317.

Zimpher, N. L. (1988). A design for the professional development of teacher leaders. *Journal of Teacher*
    Education, 39(1), 53-60.

Table 1. Teacher Participant Demographics & Leadership Roles

Teacher[2]	Grade(s) Taught [3]	Years of Experience[4]	Bachelor's Degree/ Master's Degree[5]	Areas in which they have played or currently play leadership roles												
				Teacher Recruitment	Teacher Preparation	Curriculum Development	Mentoring New Teachers	Coaching Experienced Teachers	Starr/Professional Development	Action Research	Data Driven Instruction	Educational Polity & Issues	Outreach to Parents & Communities	Grade Level Chair/Department Chair/Team Leader	Policymaking Group Advisor	National Board Certification[6]
Hannah	9-12	35	Bachelors of Arts (BA), Mathematics	X	X		X	X	X	X	X	X	X		X	
Oliver	9-12	27	BA, Chemical Engineering Masters of Arts, Education			X			X	X			X	X		
Ciara	6-8	22	Bachelors of Science (BS), Elementary Education with a Mathematics concentration			X				X				X		
Dinah	9-12	20	BS, Mathematics			X	X		X	X						
Debra	9-12	14	BS, Major not listed			X	X		X	X						X
Bev	9-12	13	BA, Mathematics	X	X	X	X				X			X		
Bess	9-12	12	BS, Mathematics		X	X	X	X	X	X	X	X	X	X	X	
Jim	9-12	10	BA, Secondary Mathematics Education	X		X	X				X			X		
Mitch	9-12	10	BS, Secondary Mathematics Education	X	X	X	X				X					
Sally	9-12	8	BS, Secondary Mathematics Education	X	X	X	X	X	X	X				X		X
Miles	9-12	8	BS, Secondary Mathematics Education		X	X	X	X	X							
Anna	9-12	4.5	BA, Mathematics	X	X	X	X		X	X			X			

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[2] Pseudonyms are use to protect anonymity

[3] Grades taught the year of the study

[4] Years of teaching experience not including the year of the study

[5] Prior to M.Ed. program

[6] National Board Certified Teachers are teachers who have successfully completed a rigorous application process involving the completion of a professional portfolio and passing of content specific testing through the National Board of Professional Teaching Standards (http://www.nbpts.org/)

Table 2. Seven Phases of Data Collection

Data Analysis Phase	Data Being Analyzed	Data Analysis Details
1	Teacher Leader Narrative Teacher Leader Survey	Read each story, highlighting key points made by each author. Tallied the responses to the survey and read the free responses. Used both the teacher leadership story and survey results to inform development of the first interview protocol.
2	Interview #1 (and previous data collection points)	Recorded each interview in addition to taking field notes. Listened to and transcribed each interview. Read each transcript looking for points that needed clarification for next interview, common themes that emerge across interviews (Miles & Huberman, 1994), and for development of the first focus group protocol. Sent each transcript by email to participant to allow for member-checking (Glesne, 1999) asking them to clarify any points and add or edit their responses.
3	Focus Group #1 (and previous data collection points)	Recorded each focus group in addition to taking field notes. Listened to and transcribed each focus group. Employed the constant-comparative method (Bogdan & Biklen, 1982) in examining all four previous data collection points (this focus group transcript, the first interview transcripts, the teacher leader survey, and the teacher leadership story). Looked for themes that continue to emerge across data points. Used preliminary findings to develop second interview protocol.
4	Interview #2 (and previous data collection points)	Recorded each interview in addition to taking field notes. Listened to and transcribed each interview. Read each transcript looking for points that needed clarification for next interview, common themes that emerge across interviews, and for development of the second focus group protocol. Sent each transcript by email to participant to allow for member-checking asking them to clarify any points and add or edit their responses. Included sTc framework in the code analysis; used four sTc elements as organizers for the identified codes.
5	Focus Group #2 (and previous data collection points)	Recorded each focus group in addition to taking field notes. Listened to and transcribed each focus group. Employed the constant-comparative method in examining transcripts in comparison with all five previous data collection points. Looked for themes that continue to emerge across data points. Continued to refine codes. Used these themes to develop the third and final interview protocol.
6	Interview #3 (and previous data collection points)	The purpose of this interview was to clarify what I am finding. The interview protocol will consist of preliminary findings that I wish to share with the participants in the form of a teacher leader profile. Each interview was recorded in addition to my taking field notes. I listened to and transcribed each interview, sending transcripts to participants to employ member-checking.
7	Final Teacher Leader Survey (and previous data collection points)	At the close of our last interview, each participant was given the post-teacher leader survey. The final phase of data analysis occurred by reviewing all eight data collection points. At this point, I reviewed the teacher leadership literature to compare what I was finding with what others have found. I synthesized my findings into a written report that was distributed to all participants to allow for one more member-check. The final analysis was written once all participants have had a chance to respond.

Figure 1. Teacher Leader Continuum Rubric

Continuum →		Visible but not Noisy	Visible with Noise	Noisy without Conflict	Instigator with Conflict	Instigator Creating Conflict
Teachers →		Bev, Ciara, Hannah, Miles, Oliver	Anna, Debra, Dinah, Sally	Bess	Jim, Mitch	
Research Question ↓	sTc elements ↓					
Perception	The dialogic conversation: *Longevity & Trust*	Trying to find place at a new school	Prefers to be quiet but will speak up if forced	Is diplomatic in garnering support	Is not afraid of being labeled for being loud but aware of stigma attached	Is proud of being labeled loud
	Metacognition: *Agency & Responsibility*	Sees self as part of larger group; often mention others as teacher leaders	Wants to be involved in teacher leadership but feels pulled away from teaching	Is Sensitive to different perspectives of other teachers and teacher leaders	Has newfound agency as a teacher leader and feels a responsibility	Considers self as teacher leader and acts
Enactment	Reflexivity: *Power & Influence*	Likes to be behind the scenes	Actions seen as teacher leadership but by other colleagues	Makes sure voice is heard	Will stand against or for action based on its harmfulness to students and/ or teachers	Creates a cause towards which to work (more proactive than reactive like "with persistence" previously)
	Authentic Activity: *Work & Scope*	Works to guide other teachers curricularly in schools	Works to guide other teachers curricularly in schools	Works to represent teachers in the school and district	Works to protect teachers and/or students from unfair policy in the school, district, and state	Works to protect teachers and/or students from unfair policies in the school, district, and nation