An Examination of the Nature of Post-Observation Feedback Provided to Middle School Mathematics Teachers

Christine Trinter
Virginia Commonwealth University, ctrinter@vcu.edu

Heather Carlson-Jaquez
Virginia Commonwealth University, carlsonha@vcu.edu

Follow this and additional works at: http://scholarscompass.vcu.edu/merc_pubs

Part of the Education Commons

Downloaded from http://scholarscompass.vcu.edu/merc_pubs/1

This Research Report is brought to you for free and open access by the MERC (Metropolitan Educational Research Consortium) at VCU Scholars Compass. It has been accepted for inclusion in MERC Publications by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.
A Research Report

An Examination of the Nature of Post-observation Feedback Provided to Middle School Mathematics Teachers

Submitted by

Christine P. Trinter, Ph.D.
Heather Carlson-Jaquez, M.M.
An Examination of the Nature of Post-Observation Feedback Provided to Middle School Mathematics Teachers

Christine P. Trinter, Ph.D.
Heather Carlson-Jaquez, M.M.

May 15, 2016
Background

Virginia Commonwealth University and the school divisions of Chesterfield, Colonial Heights, Goochland, Hanover, Henrico, Powhatan, and Richmond established the Metropolitan Educational Research Consortium (MERC) in 1991. The founding members created MERC to provide timely information to help resolve education problems identified by practicing professional educators. MERC currently provides services to over 12,000 teachers in eight school divisions. MERC has base funding from its membership. Its study teams are composed of university investigators and practitioners from the membership.

MERC is organized to serve the interests of its members by conducting and disseminating research to enhance teaching and learning in metropolitan educational settings. MERC’s research and development agenda is built around five goals:

- To improve educational decision-making through the joint development of practice-driven research.
- To anticipate significant educational issues and needs that can be researched.
- To identify proven strategies for improving instruction, leadership, policy and planning.
- To enhance the effective dissemination of research to practitioners.
- To provide research oriented professional development opportunities for school practitioners.

In addition to conducting research, MERC conducts technical and educational seminars, program evaluations, and an annual conference, and publishes reports and research briefs.

Copyright© 2016. Metropolitan Educational Research Consortium (MERC), Virginia Commonwealth University

The views expressed in MERC publications are those of individual authors and not necessarily those of the consortium or its members.
Abstract

Many studies have examined teacher evaluation but few address the discipline expertise of evaluators and the type of post-observation feedback provided to teachers. With the current focus in mathematics education on processes and justification, the type of post-observation feedback teachers receive is critical to improving instruction. This qualitative study examined the type of feedback and use of observation protocols by evaluators with different mathematical backgrounds. Findings reveal the difference in the nature of discipline specific feedback between observers as well as the difference in the way the teacher evaluation system was employed among observers. The evaluative nature of observer’s roles also influenced the form of feedback.

Introduction

Teacher evaluation systems have recently created a national stir with teacher expulsions for some and merit pay for others. The reauthorization of the Elementary and Secondary Education Act (2010) and associated educational funding initiatives (U.S. Department of Education, 2009) that focused on teacher accountability and student test scores initiated a wave of reforms at the state level for refining teacher evaluation measures to align with these federal policies. As a result, school districts nationwide have been investing time and resources into developing teacher evaluation instruments and protocols to assist administrators in documenting teacher effectiveness. While the passing of the Every Student Succeeds Act (2015) removed some of the restrictions on teacher evaluation, the extent to which this law will influence states to make additional changes to their teacher evaluation systems remains to be seen.

Many researchers recommend evaluation models that include multiple methods of data collection in an effort to account for the limitations of each measure (Milanowski, 2011). For example, Rockoff & Speroni (2011) found evidence to support that first year teachers, who received quality subjective evaluations by trained mentors, produced greater gains in student achievement with future students, but recommend both subjective evaluations by trained professionals and objective performance data to identify inadequate instruction. Similarly, Darling-Hammond et al. (2012) reported that effective systems utilize trained evaluators, provide frequent evaluation and feedback,
and integrate measures (e.g. observations, videos, artifacts) that link what teachers do to what happens as a result.

In concert with the national stir about teacher accountability is the nation’s continued focus on students’ mathematics achievement with federal initiatives seeking to increase the number of highly qualified STEM teachers, federally funded professional development programs, and partnerships between education and industry. In an effort to support the development of mathematics teachers, the National Council for Teachers of Mathematics (NCTM) recommends that leaders and policymakers empower teachers to create effective classrooms and learning environments by aligning accountability measures with mathematics teaching practices. These practices include,

- Establish mathematics goals to focus learning
- Implement tasks that promote reasoning and problem solving
- Use and connect mathematical representations
- Facilitate meaningful mathematical discourse
- Pose purposeful questions
- Build procedural fluency from conceptual understanding
- Support productive struggle in learning mathematics
- Elicit and use evidence of student thinking (PtA, 2014)

Indeed, this form of accountability takes a global approach, which aligns with the recommended evaluation models that promote the use of multiple methods of data collection (Milanowski, 2011; Rockoff & Speroni, 2011). These evaluations play a significant role in the professional growth and careers of many educators while also placing an expectation on school leaders to implement subject-specific evaluation measures. These forms of teacher accountability measures are not only designed for evaluation purposes but also for improving instruction and one of the most critical components in teacher development involves the dialogue between the evaluators and teachers which typically occurs following the administrator’s observation of instruction. Despite the importance of this post observation conference and the recommendations for subject specificity in accountability measures, there is little
research pertaining to the ways in which administrators attend to subject-specific details in evaluation and instructional improvement (Lochmiller, 2016) such as those recommended by the NCTM.

**Purpose of the Study**

We conducted this study for the purpose of examining the nature of feedback middle school mathematics teachers received from administrators who had different formal education or experiences in mathematics than one another. We were particularly interested in teachers’ perceptions of the feedback that they received, administrators’ perceptions of the feedback they provided, and in also in comparing administrators’ perceptions to the written feedback that teachers received. This exploratory study included eleven participants from three different schools and divisions. We collected several forms of data including teacher evaluations, classroom artifacts, and approximately 4 hours of interviews.

We begin by providing a review of literature relevant to teacher feedback and include a specific focus on feedback provided to mathematics educators. Following this review, we included the theoretical perspectives that framed the study, our study findings, and the ensuing discussion and implications for mathematics teacher development.

**Relevant Literature**

**The Nature and Benefits of Observation and Feedback to Teachers**

A commonly employed method for promoting dialogue between evaluators and teachers and one that is included in recommended models (Darling-Hammond & Snyder, 2000; Moss, et al., 2004) as well as many states evaluation plans (Ohio Department of Education, n.d.; Michigan Department of Education, n.d.; Virginia Department of Education, 2011) is observation and feedback from administrators. This method is often included in teacher evaluation frameworks that look at multiple aspects of teaching and learning (Sartain, Stoelinga & Brown, 2011). An important component of this process is the feedback that the teacher receives from the evaluator (Scheeler, Ruhl, & McAfee, 2004; Darling-Hammond, Amrein-Beardsley, Haertel, & Rothstein, 2012). Assessment research tells us that feedback is most effective when it communicates the current level of achievement in relation to the set forth goals and
provides steps to attaining these goals (McMillan, 2011). Furthermore, quality feedback can be described as timely, specific and frequent (Northcraft, Schmidt, & Ashford, 2011; Price, Handley, Millar, & O'Donovan, 2010). Previous studies with college students have found that feedback also provides a space where the evaluator can express care and respect for those who are being evaluated; this can help calm anxiety and regulate emotions of those who are receiving the feedback (Rowe, 2010). Teacher evaluations should include specific and clear feedback so that teachers can improve their practice using the results (Milanowski A. , 2011).

A review of literature on feedback to teachers conducted by Scheeler, Ruhl and McAfee (2004) found 208 articles were published on feedback to teachers between 1970-2004; however, only 4% of those articles focused on in-service teachers, with the rest focusing on pre-service teachers. The authors narrowed the focus of their review by choosing articles that had an independent variable that was a dimension of feedback (nature of feedback, temporal dimensions of feedback, and who gives feedback) and were true experimental or quasi-experimental. They concluded “feedback is better than no feedback, immediate feedback is better than delayed feedback, and feedback that is immediate, specific, positive and corrective holds the most promise for bringing about lasting change in teaching behavior” (p. 405). Though some studies on feedback to teachers consider the method of delivery of the feedback and who gives the feedback, these studies lack the validity required to make broad generalizations (Scheeler, Ruhl, & McAfee, 2004). Sartain, Stoelinga & Brown (2011) studied the effectiveness of a teacher evaluation framework that employed the observation/feedback model between administrators and teachers. The researchers found that some areas of the protocol, with regard to both observation and feedback, were reliable while others were less consistent. In particular, teachers were observed by both a researcher and an administrator with each observer using a common scale to rate the instruction. When reporting on the higher end of the scale (proficient or distinguished instruction), there was significant discrepancy between the observation ratings. Administrators were more likely than the researcher to rate a teacher as “distinguished”. In this same study, the conversations between administrators and teachers were observed and the analysis showed that principals were more likely to ask “low end” questions that did not invoke reflective conversation versus “high end” questions that sparked deeper discussion about the instruction. Administrators explained that they took into account their relationship with the teacher as well as the teacher’s prior evaluations when rating the teacher.
Considering the personal nature of the observer-feedback evaluation cycle, the experiences and perceptions of teachers and observers are also noteworthy. Studies that have looked at teacher and administrator perceptions and experiences emphasize the need for multiple observers, specific, written feedback coupled with dialogue, and adequate time for the full cycle to be effectively employed (Collins, 2004; Ovando, 2005; Ovando & Ramirez, 2006). Specifically, in one qualitative study, teachers and administrators had different perceptions of the nature of the given feedback following teacher observations (Collins, 2004). Teachers in this study believed that when instruction was satisfactory, they received no feedback from administrators. This was problematic for teachers as they expressed a need for feedback, regardless of the nature of instruction. The administrator believed that negative written feedback held the potential for lowering morale which had the potential to result in poor performance, and therefore, limited the written feedback. Collins recommends that the evaluation process should be modified to include supplemental observers such as department heads and senior teachers. These observers would be subject experts and together with the administrator’s observation, the evaluation process would be more comprehensive and would include sharing written feedback documents with teachers.

Using action research methodology, Ovando (2005) examined the experiences of teachers and administrators during their observation and feedback cycle. Administrators reported that in order to effectively provide written feedback they should develop knowledge of quality instruction, scripting skills and appropriate professional language during graduate work. Similar to Collins’ (2004) finding, administrators commented on the importance of adequate time to write the feedback and include the strengths and weaknesses of instruction and teachers noted the importance of specificity in written feedback. Additionally, they appreciated face-to-face conversation about the observation and the written feedback. Some of the components for effective feedback include post-observation conferences between the administrator and teacher that (1) focus on the strengths of the instruction, (2) are based on observable actions and (3) result in professional development goals for the teacher (Ovando, 2005).
Subject-Specific Feedback

With the current focus in mathematics education on process standards, student mathematical dialogue, justification, and modeling (Common Core State Standards-Math, 2012; NCTM, 2000; VA Department of Education Standards of Learning, 2009), it is critical that administrators direct their attention to more than pedagogical and behavioral concerns in instruction but also value subject matter in both the content and the practice of disciplines (Nelson & Sassi, 2000). In 1989, The National Council of Teachers of Mathematics published its Professional Standards for Teachers of Mathematics. These standards outlined best practices with regard to teaching mathematics and the evaluation of, support for and development of mathematics educators. These standards have been upheld as guideposts for exemplary mathematics teaching and learning for decades (Jacobs et al., 2006). In this document, the NCTM described eight evaluation standards and stated “each standard serves as a statement about what should be observed regardless of who is doing the observing” (Introduction section). According to the NCTM, evaluations of teachers’ competence should adhere to these standards and the process of evaluation described. Central to the process of evaluation is the inclusion of multiple observations from more than a single observer with the teacher involved as a reflective practitioner, providing information to the observer about the teacher’s goals and a self-analysis of teaching. The goal of the observations and post observation dialogue should be to provide information for a professional development plan focused on improving instruction and not to simply check a box to fulfill a school district teacher evaluation protocol.

Recently, the NCTM has extended this work by publishing Principles to Actions: Ensuring Mathematical Success for All that recommends specific teacher and stakeholder actions which, they content, will ensure students success in mathematics. In particular, this document recommends that leaders and policymakers (including school division administration) provide supports for ensuring student access to high level mathematics education in the following ways,

- Align accountability measures for teachers and principals with the Mathematics Teacher Practices,
- Ensure that teachers at all levels are emphasizing the mathematical practices as a key element of their instruction for all students,
- Allocate resources for the staffing of mathematics instructional coaches or specialists in schools,
- Base decisions about licensing teachers, evaluating teachers, or student course placement on evidence from multiple measures,

- Observe lessons or engage in classroom walkthroughs, using the Mathematics Teaching Practices as the focus, (p. 110-114).

These recommendations for teacher evaluation support the research literature, which endorses evaluation models that include multiple data collection sources. Despite the NCTM’s recommendation for mathematics specific dialogue and evidence of content mastery, very few studies have taken a look at subject-specific observation and feedback (Lochmiller, 2016; McDonald, 2008; Nelson & Sassi, 2000). Nelson & Sassi (2000) examined the nature of administrators’ observations of a video-recorded fifth grade mathematics lesson and found that administrators appreciated different aspects of the lesson during their first observation then during a second viewing, eight months later. During the first observation, administrators were appreciating the structural features of the lesson including “orderliness, good classroom management, understandable and well-executed structural components to the lesson and teacher behaviors such as wait time and gender equities (p. 565).” After viewing the video a second time and at least 8 months into a professional development seminar for administrators on observation and supervision of elementary mathematics, the administrators were observing subject-specific features of the lesson. For example, administrators noticed the nature of the students’ mathematical discourse. The observation shifted from teacher action and surface features of instruction to the development of ideas. The findings from this study also indicate that sense-making develops differently in different disciplines and content and pedagogy are intertwined in teachers’ instructional decision making. The relationship between content and pedagogy is unique to each discipline due to subject specific procedures, language and concepts (Nelson & Sassi, 2000) and this must be taken into consideration when preparing supervisors for observing and evaluating mathematics teachers.

More recently, Lochmiller (2016) interviewed 51 participants including 20 math teachers, 19 science teachers and 12 administrators, and examined these participants’ perceptions of feedback that they received or provided. Findings indicated that the math and science teachers perceived the feedback that they received as being generalist in nature and not addressing content-specific instructional matters. Administrators used their past teaching experiences to help frame their feedback to
teachers across content areas. These findings have implications for the development of educational leaders for supervising teachers in multiple subject areas as well as important considerations for teacher evaluation standards.

Considering the importance of feedback for improving instruction, we seek to extend the literature centered on discipline specific leadership and teacher development by examining the nature of feedback provided to teachers by observers with different content backgrounds. We are particularly interested in middle grades mathematics teacher feedback because this grade band and subject are in a transition period with many higher level mathematics courses now being taught in the middle grades, and teachers in these grades feeling pressure from both the grade bands below and above them. Feedback to mathematics teachers in these grades may be instrumental in developing their practice.

**Theoretical Framework**

We drew from two theoretical perspectives in the design and analysis of this study, leadership content knowledge (Stein & Nelson, 2003) and complexity leadership theory (Uhi-Bien et al., 2007). Leadership content knowledge contends that the subject matter knowledge of an administrator plays a role in his or her leadership functions. Stein and Nelson define leadership content knowledge as “the knowledge of subjects and how students learn them that is used by administrators when they function as instructional leaders” (p. 445). At the school level, this form of knowledge may play a role in an administrator’s feedback about lessons or instruction. Stein and Nelson explain that leadership content knowledge is at the crossroad between subject matter knowledge and leadership practice and state “Without knowledge that connects subject matter, learning, and teaching to acts of leadership, leadership floats disconnected from the very processes it is designed to govern” (p. 446).

Recognizing that school administrators cannot become experts in all content areas within one school, Stein & Nelson (2003) recommend a distributed approach to leadership and within this approach employing “postholing” to support disparities in leaders’ subject matter knowledge. A distributed approach acknowledges that schools are complex entities with many resources for supporting leaders in increasing their subject matter knowledge. In mathematics, these resources may include mathematics specialists, teachers, curriculum coordinators, or tangible materials such as curricula,
standards, or observation protocols. Leaders should draw from these available resources for building their own capacity in a subject area. Postholing refers to the process of learning a slice of one subject at a very deep level. In this way, administrators gain an understanding for how the subject is constructed, what conceptual meaning looks like in that subject, and how students come to understand the content. Administrators should have a firm understanding of one discipline and use postholing to make sense of the other disciplines for which he or she is responsible for providing instructional leadership.

Because school leadership is a multifaceted arena, and our administrative participants held different evaluative roles within this space, we also drew from complexity leadership theory (CLT) in analyzing the data for this study. This theory purports that there are three ways in which leadership manifests itself, (1) administrative leadership, (2) adaptive leadership, and (3) enabling leadership. Administrative leadership acknowledges the bureaucracy inherent in managerial leadership; adaptive leadership considers the fluidity and interactive nature of leadership that “produces adaptive outcomes in a social system” (p. 306). Adaptive leadership promotes change in an organization and does not result from one individual or entity but rather, dynamic interactions between people and ideas initiated by a problem or struggle. Enabling leadership assists in the emergence of adaptive leadership by providing resources, structures, systems or facilitating dynamics that catalyze adaptive leadership. “Catalyzing refers to activities that bring together the enabling conditions (mechanisms and contexts) necessary for adaptive leadership to emerge” (p. 309). Enabling leadership promotes interdependency, and complexity leadership theory posits that leadership exists in, and is a function of, interaction.

For the purposes of this project, we see CLT as providing a framework for the interactions among observers who hold different roles in the school system including central office administration, principal and assistant principals, and mathematics specialists and their interactions with veteran and novice teachers. Additionally, CLT attends to the dynamics between these stakeholders and their material resources such as observation tools and curriculum, and considers how these relationships and interactions fit into the larger school system. These dynamics may play a role in the nature of feedback that teachers receive.
We feel that leadership content knowledge and CLT compliment one another in that both theories rely on interactions between leaders and personnel on multiple levels. We purport that leadership content knowledge has the potential to promote enabling and adaptive leadership while it also may be influenced by administrative leadership. Drawing from these two theories, the research questions explored were:

1) In what ways does post-observation feedback differ among observers with different mathematical backgrounds and evaluative roles?

2) How does the mathematical background of the observer shape his or her use of the school district’s teacher evaluation system observation instrument?

Method

We conducted a multi-case qualitative study using data collected from four middle schools located in three different school divisions in a mid-Atlantic state. Our analysis is grounded in the theoretical frameworks, leadership content knowledge and complexity leadership theory, and as such, we chose a multiple case design and employed replication logic as means for increasing external validity of the study (Yin, 2003). Because of the similarities among the experiences of the four teacher-observer groups, findings will be reported as a cross-case analysis (Yin, 2003). In this way, single cases are not presented separately; they are threaded among the four themes, which frame the findings.

Site and Participant Selections

This study was conducted as a community engaged research project. Community engaged research is defined as “a collaborative process between the researcher and community partner that creates and disseminates knowledge and creative expression with the goal of contributing to the discipline and strengthening the well-being of the community. CEnR identifies the assets of all stakeholders and incorporates them in the design and conduct of the different phases of the research process” (CEnR, 2013). In this CEnR project, a team of 11 administrators worked with the two researchers as part of a study team. This study team worked collaboratively with the researchers in identifying the study questions, designing the project, and recruiting participants.
The study design called for three person teams consisting of two administrators (who had different levels of formal mathematics education or experience) and one teacher, such that the teacher was observed by each administrator (on different occasions) and given feedback about his or her instruction during each of these observations. The study team shared this request with their school divisions and four teams of teacher-administrators volunteered. Of these four, there were three groups of three-person teams that included two administrators (one with mathematics background or experience and the other with a different academic background) and one teacher. The fourth team included one teacher and one administrator who did not have a formal mathematics background. These participants were employed in three different schools and divisions. The administrators completed surveys detailing their level of mathematics education/experience prior to the start of the study (See Appendix A). Table 1 details the four teams in this study (all names are pseudonyms).
<table>
<thead>
<tr>
<th><strong>Teacher</strong></th>
<th><strong>Observer</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary Thomas</td>
<td>Beth Smith 13 years science teacher, history &amp; language arts 2 years;</td>
</tr>
<tr>
<td></td>
<td>liberal studies/elementary education undergraduate; administration masters</td>
</tr>
<tr>
<td></td>
<td>Jennifer Garcia Master’s Degree in Education with focus on mathematics;</td>
</tr>
<tr>
<td></td>
<td>23 years teaching mathematics; mathematics undergraduate</td>
</tr>
<tr>
<td>Lisa Niles</td>
<td>Beth Smith See above.</td>
</tr>
<tr>
<td></td>
<td>Kate Rand Master’s Degree Supervision with math endorsement; 10 years</td>
</tr>
<tr>
<td></td>
<td>mathematics teaching; elementary and middle education undergraduate with</td>
</tr>
<tr>
<td></td>
<td>high school endorsement</td>
</tr>
<tr>
<td>Rob Russo</td>
<td>Carol Jones Counselor, Secondary Educational Leadership Certificate*</td>
</tr>
<tr>
<td></td>
<td>7 years math teacher, liberal studies undergraduate; k-8 mathematics</td>
</tr>
<tr>
<td></td>
<td>and administration masters</td>
</tr>
<tr>
<td>Ann Mayer</td>
<td>June Flowers Margret Date Special Education*</td>
</tr>
</tbody>
</table>

*Ms. Jones and Ms. Dade did not complete the background survey. The information about the backgrounds of these participants in table 1 is taken from our interview data and is not necessarily a complete description of each of their academic or professional experience but we were informed that neither of them had formal mathematics education or professional experience.
Analysis

The administrators held different roles within each of their school divisions and these roles played a part in our analysis. Jennifer Garcia is employed as a mathematics specialist with Madison school district and in this role she does not formally evaluate teachers. Therefore, Ms. Garcia will be referred to as an “observer” instead of an administrator while the other five all hold administrative and hence, evaluative roles in their divisions. Margaret Dade and Carol Jones are school principals, June Flowers and Beth Smith are assistant principals, Kate Rand works as a central office administrator.

In the interest of protecting participants’ identities and also to maintain the multi-case reporting in the aggregate, the pseudonyms used in Table 1 will not be used when reporting the data. These pseudonyms are included in the table to provide the reader with descriptive information about each teacher and administrator.

Data Collection and Sources

Data collection was conducted at the participating middle schools both in the classroom and during post observation meetings in locations chosen by the teachers and administrators such as offices or the school library. Data sources include: (1) field notes taken during observations of teacher instruction, (2) teacher evaluation or post-observation written documents, (3) teacher lesson plans or other classroom artifacts, (4) semi-structured interviews conducted individually with teachers and administrators, (5) mathematical background surveys completed by administrators, (6) teacher evaluation protocols for each participating district.

Researchers observed teacher instruction alongside each administrator and recorded detailed notes during these observations. Following instruction and the administrator/teacher post-observation conference, the first author interviewed each administrator and the teachers individually (See Appendix B). These interviews were audio recorded and later transcribed by both researchers. Teachers also shared the written evaluations they received from the administrators or observer during their post-observation conference and some also provided lesson plans or other classroom artifacts.

Data Analysis

Qualitative methods were used to analyze the data in this descriptive, exploratory study. Three phases of analysis were employed. In phase one, the teacher and
administrator/observer interviews were analyzed using open and axial coding (Strauss & Corbin, 1990). While we were not seeking to develop theory, we felt that open coding was most appropriate given the limited research done on this topic. Because our theoretical framework influenced the design of the study, we naturally gathered data, which also adhered to these guiding principles. Hence, our open codes included many references toward the nature, development, and perceptions of feedback. We then grouped these open codes into sensible themes during the axial coding phase. In this way, we came up with specific themes such as inductive and deductive approaches to developing feedback and content or behavioral feedback. Next, these themes were analyzed against the written feedback teachers received in their post-observation conferences along with the researcher’s observation notes in search of confirming or disconfirming evidence.

To increase the internal validity in the study, the researchers employed a peer debriefing process (Creswell & Miller, 2000; Lincoln & Guba, 1985). The first author conducted the primary data analysis and the second author acted as a peer debriefer. While the second author has been involved in the study from the outset, she was primarily involved in developing the literature review and transcribing interviews, which allowed her to maintain a more objective role. Her professional and academic background is in music education which positions her well to counter the first author’s bias as a mathematics educator. The focus of the peer debriefing process was to carefully look for overemphasized points, underemphasized points, vague descriptions, general errors in the data, and biases or assumptions. To do this, the peer debriefer read the findings and compared these to the raw data. Based on this analysis and her accompanying report, the first author made minor modifications to the findings such as including more descriptive terminology for underemphasized points.

Findings
The design of this study involved a descriptive analysis of the differences in post-observation feedback provided to teachers, the teachers’ and observers’ perceptions of the feedback, and the alignment with the employed observation protocol. Feedback took both oral and written forms; the evaluative roles and school district protocols influenced the nature of the written feedback among observers. Within the framework of leadership content knowledge and complexity leadership theory, four
major themes emerged with regard to how different mathematical backgrounds and/or evaluative roles of observers influenced their feedback, including (1) the form of the feedback (written and oral), (2) the feedback process, (3) the nature of feedback (content or pedagogical focus), and (4) alignment with content.

We begin by providing an overview of the two forms of feedback teachers received, oral and written, and the participants’ perceptions of each of these forms of feedback. Next, we describe the differences in the approach observers, with different mathematical backgrounds, took to documenting observations and follow this with an exploration of the contrast between the natures of feedback produced from these observations. We conclude with a description and analysis of teachers’ perspectives of the alignment between their evaluations and the mathematical learning goals of the observed lesson.

**Forms of Feedback**

The evaluative role of the observer seemed to influence the type of feedback provided (oral and/or written) to the teachers in that the mathematics specialist (one non-evaluative observer) focused more on oral communication with some written narrative, and the five administrators in evaluative roles, balanced oral with written communication. We begin by describing the written and oral feedback the teachers received and participants’ perspectives on the importance of these forms of feedback.

**Written Feedback**

Of the five observers, four held administrative (evaluative) roles and one was a mathematics specialist (non-evaluative). Post-observation feedback was provided in both oral and written form for all participants in this study. All observers, regardless of their mathematical background or evaluative role, commented on the importance of written feedback for providing a tangible document for teachers to reference and use for reflection and also noted that contextualizing this written feedback with a discussion is essential with many preferring oral feedback to written.

The five administrators (three without formal mathematical backgrounds and two with mathematical backgrounds) were required by their districts to submit pre-designed observation protocols, aligned with the state standards for the professional practice of teachers, to fulfill their evaluation duties. These protocols included space for observers to (1) include narrative descriptions of the observation, (2) identify observed
professional standards by checking boxes associated with each standard and substandard, and in one case, (3) rate the level of observed implementation of professional standards on Likert scales.

All observers were interested in providing teachers with written feedback for reflective growth, and it seemed that the pre-designed written protocol was used to provide evidence and documentation. Some of the administrator’s statements regarding the importance of written feedback included: “I think you have to have the written, it’s documentation and that’s where you start”, “Written because a teacher can read it and walk away and come back and see it differently” and “I think that you start with the dialogue but you need to provide the written for reflection... I think the written is important but I would start with the conversation and leave with the written or come back to it as a reference.”

Analysis of the written documentation revealed that the pre-designed protocols allowed for different levels of narrative feedback. Two district’s protocols included space for narrative text after each of the seven professional standards where observers could document evidence of instruction while the third district protocol provided one text box for only summative feedback at the end of the document. On the two protocols that included space for narrative feedback for each professional standard, observers included verbatim, scripted documentation of the interaction between teachers and students. For example, for Standard 3, Instructional Delivery: The employee effectively engages students in learning by using a variety of instructional strategies in order to meet individual learning needs, the observer scripted the teacher’s actions and dialogue as follows: “With an orange marker, Ms. (teacher name) wrote a top, bottom chart on several students’ papers...Student asks ‘Can I use a calculator? You can do it first without a calculator, then check with a calculator.’ (This is only a small portion of the extensive script). This form of scripted documentation was consistent throughout all of the five administrators’ written documents for these two districts.

In addition to this scripting, observers checked boxes indicating that a teacher met various sub-parts of each standard. The third district’s protocol included a pre-written narrative describing teachers’ attainment of each goal and the observer chose which level of overall attainment the teacher received (exemplary, proficient, developing/needs improvement or unacceptable) for each standard. All teachers in this district,
regardless of discipline, received the same narrative feedback for each standard and custom feedback at the end of the protocol for overall comments. Among the three districts, all observers provided some level of personal, written feedback to the teachers, apart from the scripted documentation of the lesson or the pre-determined text. These narratives ranged from three sentences to two paragraphs in length.

Because of her non-evaluative role, the mathematics specialist was not required to submit a pre-designed protocol for the teacher’s evaluation file. She developed written feedback, during the post-observation conference with the teacher, in the form of open notes. Because she was interested in maintaining a non-evaluative relationship with the teacher, the specialist commented that she did not document scripted dialogue about her observations, instead she focused on building teacher capacity for reflective thinking as evidenced in her statement: “So when I meet with them I try to look at more, get them reflective thinking about what they did, how it worked, what could we do differently, and I think the angle here is what these students need to know.” The written documents from her post-observation conference included four quadrants titled (1) what’s working, (2) focus-concerns-challenges, (3) teacher’s next steps, and (4) coach’s next steps. Each of these quadrants contained between two and four specific statements written by the specialist pertaining to the teacher’s lesson and next steps. These statements were generated during the post-observation conference with this teacher. This is noteworthy because the observation protocol (or absence of a protocol) influenced the form of the observer’s written feedback. The mathematics specialist took an inductive approach to observations and was not required to link her written observations to a set of pre-determined standards.

**Oral Feedback**

Both teachers and observers noted the importance of post-observation feedback delivered orally. Teachers expressed that engaging in discussion about the complex interactions taking place in the classroom are more effective for helping them understand the motivation behind the observers’ feedback. They also indicated that these discussions have the greatest impact on their learning. For example, one teacher commented “for me what I take out of it is what I hear from them” while another explained “the one-on-one conversation is more effective than this (written) because I can sit here and read this but ... I take so much more from talking to someone than just
reading through it.” Another teacher described the importance of conversation because of the emotional and physical characteristics embedded in communication,

> being able to talk to somebody sometimes you can hear them better than reading what’s there because you can interpret their tone of voice any way you want to on a piece of paper or on email but to sit right in front of them and have them tell you how they are feeling, you know emotion, face, expressions, body language, all of that tells a lot.

Similarly, observers felt that oral communication provided opportunity for contextualizing the feedback and several of the observers credited this conversational feedback with teacher understanding. One observer stated: “The oral piece is what helps teachers understand what you can’t always say because you’re limited to a document or a form” and another commented: “I think that the teachers get more out of a conversation than a piece of paper.”

Oral feedback also provides an opportunity to problem solve and affirm teacher self-efficacy. “I think that your problem solving piece comes out of the oral discussion with teachers if there is a problem. It doesn’t come out of the written piece usually.” Even in situations when the observation protocol did not require a post-observation debrief, the administrators commented on the importance of finding the time to discuss written feedback.

> Oral is good because after meeting these people they say I feel so much better talking to you. So, there is something about that conversation that’s important that the written just won’t ever touch and so I’ve got to keep both. So, even if I sit in observation, I’ll do hall duty and I’ll walk by a teacher and I’m like hey – did you get the observation, what did you think about that? You did a great job. That’s still important to say well hey, did you see the questions, let’s find a time to meet because they still need that.

Another administrator’s goal was to create a collaborative space for discussing the observation and addressing the written feedback as evidenced below.

> …it (the observation protocol) did not require a formal conversation for like a walk-through or even really in most cases informals. For informals and formals I tend to still schedule that conversation especially if it’s not
someone who necessarily knows me because I think you begin with the conversation but you try to capture what you said in written form for people to go back and reflect on, so often in a post conference as you've talked and worked things through I'll add written things as part of that so I might come in with typed comments but that doesn't necessarily mean that it's the final it, and I think the conversation, the dialogue you've had will either add or supplement to that.

While observers’ mathematical backgrounds did not influence their choice of including written or oral feedback in their post-observation communication, the evaluative role of administrators required them to use a pre-designed protocol. This protocol illustrates a form of administrative leadership (Uhi-Bien et al., 2007), while the mathematics specialist’s freedom in selecting the focus of her attention was not influenced by an administrative provision.

**Observers Approach to Generating Feedback**

While observers’ evaluative roles influenced the form of written feedback that they produced in terms of aligning observations to professional standards or only providing open notes, their mathematical backgrounds also seemed to influence the approach each took when engaging in their observations and developing feedback. Observers with mathematical backgrounds tended to take a more inductive approach and observers with non-mathematical backgrounds took a more deductive approach to preparing feedback. As noted, administrators (in evaluative roles) were required to submit a completed post-observation form for the teacher’s file but the administrators were not required to use these forms when developing feedback. We found that the administrators who did not have mathematical backgrounds chose to use the post-observation form as a guideline while observing teacher instruction and those with mathematical background did not.

**Inductive Approach**

When asked to describe the process that they used to prepare feedback to teachers, all three of the observers with mathematical backgrounds described an inductive approach to documenting observations and preparing feedback. These observers started with a blank page and took extensive notes while observing the teachers’ instruction. These accounts were supported by the first author’s observations of the
specialist and administrators as they observed in each classroom. This process for documenting teachers’ discourse and actions did not begin with a pre-determined list of standards or ‘look fors’, instead, each observer used his or her expertise, experience, and teacher’s personal growth goals to decide where to focus her attention. One administrator described her process in this way, “…I type everything, I just take notes the whole time and then I ask questions within my notes”. Another observer began her observation by documenting student engagement and student-teacher mathematical discourse on a student roster. She then typed all of her observations into a form, that she created, and summarizes those notes for use in the post-observation conference,

*I summarize them [open notes] and type them because it helps me think and then anytime I see something like I’ve put marks in here of things I want to address with her or observations that I’ve made, I’ll put them in there….So what I’ll do is I’ll go through and put my notes into [her form] and then focus on the things. So I talk to them, the whole purpose of when I talk to them is what they saw. It is because the other piece of what I do is, teachers don’t take time to reflect on their teaching. They don’t have time...In a formal observation is did you check all of the boxes? For me it is - is your teaching doing what you want your teaching to do?

Similarly, the third administrator begins by looking for student discourse and prepares a seating chart to document circulation and student activity. Her focus is on patterns that emerge during instruction and presents this information to the teacher by showing the teacher her written narrative and pictorial documentation of the classroom interactions. In particular, this administrator describes her process in the following way,

*I always develop a seating chart. ... I have data collections for when students responded and when students went to the board, sometimes I look at circulation patterns. Initially I try to take in everything and see if I see a pattern emerge. You’ll see lots of different data points in my notes. I tend to capture a lot of questions that teachers are asking so I’m really looking at that level of questioning and engagement. I look for what students are saying ... so that’s my entry point of conversation for her, is to kind of present what I’ve collected in my observation and for the teacher to really have a point of analysis with it before I make a judgement or suggestion. So for example today I can, I will list on my observation all of the questions, I’ll have her look at the questions, I’ll
have her look at the number of kids that responded, the number of kids that went to the board. I will provide for her, I will point out how many questions were all of the students required to do? ... what I'll do is I'll also take that and put it into the 7 standards.

As stated, this third administrator aligns her open notes with the seven professional standards on the district’s evaluation protocol. In addition to aligning the narrative with these standards, the administrator also includes a copy of all of her notes with the pre-designed protocol so teachers have access to these notes in addition to the formal form. All three observers with mathematics backgrounds commented that their open notes drove their post-observation conferences and two of the three provided these notes to the teacher for the purpose of teacher reflection.

**Deductive Approach**

The two administrators (non-mathematical backgrounds) who were interviewed for this study stated that they used their district’s evaluation protocols when developing observation notes for teacher feedback and these statements were supported with the first author’s observations of these classroom visits. One of the two districts uses only electronic feedback in that the evaluation protocol is housed online and the teacher receives an electronic communication containing his or her written feedback. Teachers’ personal growth goals are also stored in the online system. In the quote below, the administrator describes the usefulness of the electronic system for providing feedback,

...there is an exemplary, proficient, needs improvement, and unacceptable. So from each standard we can rate what we have seen and how it rates from across the four ratings. So it actually is good because teachers see it automatically, um after we submit it, we clean it up and then we submit it. It gives us a chance to speak to teachers about what we have seen and how to improve.

This administrator explained that she looks for an engaged classroom environment, with an agenda, standards and objectives posted on the board and a variety of other management strategies such as bell ringers and transition time. The administrator uses the electronic document to rate the level (exemplary, proficient, developing or unacceptable) for which she observes the standards that align with her observations. A summative statement is provided at the end of the document.
The other administrator also uses an online system but the teacher receives the written feedback in hard copy form during the post-observation conference. This administrator used the district evaluation protocol to structure her note-taking during the observation and then re-organized her notes prior to discussing them with the teacher. Her process is illustrated in the following quote,

while I'm watching the class I have this form on my computer, and taking notes, and I really do go back and forth between the seven standards. So a lot of what I saw today in the lesson, I was documenting under, initially I documented under instructional delivery because that's usually what you see the most of, you're giving feedback on the delivery. But then as I go back to it later in my office, later on, I'll take pieces out of and fit them into that speaks more to learning environment or this is really about assessing your learners and so I'll dissect it a little bit more and figure out where would then our district form fit that I took notes actually fit. Because what I'm trying to do for the teachers as well is document not only did they meet standard 3 instructional delivery but each bullet that was under standard 3 that they met it or that's an area that they can improve on.

The deductive approach to composing feedback employed the protocol as a framework for the “look fors” in an observation. Observers who used the inductive approach explained that they were looking at discourse, development of mathematics, student engagement and activity.

Teachers Perspectives of Inductive and Seductive Generated Feedback

There were notable difference between teachers’ perceptions of the feedback they received in cases when the inductive, open notes were shared with teachers and cases where teachers only received the formal observation protocol. All teachers appreciated feedback, regardless of the format, but the two teachers who were given the narrative notes commented on the specificity and comprehensiveness of the narrative feedback and also viewed the purpose of feedback as a means for improving instruction and the open narrative as supporting the formal observation protocol. One teacher commented about the open note, narrative feedback that she received,

...hers was the most extensive and detailed feedback that I've ever gotten. Just because it was so detailed and so, from so many angles and you could tell that she was really paying attention to every single detail
and how she did that I don’t know, she was just, she got, she seemed to get everything.

The other teacher compared the open, narrative feedback with the formal observation protocol. She indicated that both were valuable and the open notes coupled with oral conversation provided specific information about instruction that supported the formal observation protocol. Below is her description of the feedback from two observers, the mathematics specialist inductively prepared observation and the administrator’s deductively prepared.

...is a math person and so she can come in and give me very specifics of things that she thought I should touch on ...she would say, hey you really need to emphasize this a little bit more and [administrator] is going to give me the nuts and bolts, making sure everything stays together. [math specialist] gets to dig a little bit deeper into the math end.

The other two teachers in this study received the formal observation protocol from their administrators and did not see any open notes from these observations. One of these administrators prepared her observation using an inductive approach but these notes were not shared with the teacher in written form and were only summarized into the standards of the formal protocol. The teacher in this situation described the purpose of the feedback as documenting evidence of her work for her accountability and “keeping everyone on task and in the right direction.” She commented that her math-focused administrator (who developed inductive open notes but did not share these with the teacher) provided valuable suggestions specific to improving her mathematics instruction and she noted that the difficulty lay in that these were not written down. The teacher described her conversation with this administrator as discussing the formal observation protocol bullet points and “on top of that she’ll tell me well here’s how we work on that because she’s had experience in the classroom teaching math.” This case illustrates teachers’ perceptions of the value in mathematics specific inductive, open notes as a form of written feedback.

Similarly, the other teacher who did not receive this form of inductive feedback indicated a preference for mathematics specific suggestions, which were not present on the formal observation protocol. While this teacher (and all teachers in this study)
highly valued the feedback they received, it was noted that immediate changes to classroom instruction often result from pedagogical content specific suggestions,

... if it is an administrator talking about the layout of the classroom or student engagement that feedback might take longer to implement but when a colleague comes in and says, well you are using the slide and divide method for factoring and we really want you to use grouping, that is an immediate change I can make.

Furthermore, all teachers value specific feedback and concrete examples for improving instruction. For example, “I like information that is very detailed um... the class was on task... what does that mean? What did you see that made you think the class was on task?” The formal observation protocol for this teacher has one space, at the end of the document, for a summative statement where this level of detail may take place but in this case, the summative statement was brief and broad sweeping. Preceding this text box were five pages of standards-based Likert scales for rating the teacher on the professional standards, which are not customized for individual lessons and hence, lack specificity for instructional improvement.

Feedback Focused on Content and Pedagogy
All participants in this study believed that the most effective form of feedback comes in specific and concrete suggestions for improving instruction. Moreover, all four of the teachers observed a difference in the nature of feedback, and hence, the kinds of suggestions, they received from observers who had formal mathematical background and those who did not. Analysis of the written documents supported teachers’ perceptions of these differences with observers who have formal mathematics backgrounds providing more math-content focused feedback and observers with backgrounds from non-mathematics disciplines focusing more on pedagogy and classroom management. Observers recognized challenges in providing feedback outside of their content areas and provided examples for the ways in which they addressed these challenges in order to provide effective support for their teacher colleagues.

Teachers’ Perspectives
Teachers perceived the nature of feedback from observers with mathematics background as focused on the development of the mathematics in the lesson and the feedback from administrators with non-mathematics backgrounds as centering on
general pedagogy and classroom management. When asked about the difference in the nature of feedback from each observer, teachers noted the ability of observers with mathematics backgrounds to (1) provide guidance on vertical alignment of content, (2) suggest mathematics specific pedagogy and (3) give recommendations for how to increase the level of questioning. When asked to describe differences in feedback between observers with math backgrounds and those with different disciplinary knowledge, teachers stated,

from a math perspective it's just like straight off the bat, she said that I did integrate key content elements and used their higher level thinking skills and I'm able to link present content with past and future learning experiences in other subject areas

Certainly, someone with a math background would be able to look at my lessons, pick them apart, more so than someone without a math background. Um, because they are going to be willing to ask questions like why do you use this method of factoring versus another or why is it that you teach laws of exponents before you teach some other topic? So they could ask more pointed questions, and I also think that person if they are evaluating the vertical team, going from the algebra to the geometry to the algebra II to the pre-calculus, they probably could give feedback along the lines of what you are doing is setting students up for the next level.

she was able to give me feedback about not only students but she gave me feedback that was directed at higher level questioning. ... so that was helpful for her where I don’t know that somebody coming in without a math background would have those kinds of questions.

but there were a couple of things that she said that were you know, I think it was just extension like asking a lot of extension questions for them and seeing how far I could take their knowledge and so that was helpful for her where I don’t know that somebody coming in without a math background would have those kinds of questions.

Similarly, teachers perceived the feedback they received from observers with non-mathematics backgrounds as focusing on instructional strategies and classroom management. For example, one teacher speculated, “I think [administrator with non-math background] will talk to me about how everything ties together. Like the professional knowledge the classroom behavior and demeanor, my management
system.” Another teacher described the type of feedback she received from her administrator as focusing on discipline and classroom management with suggestions such as using popsicle sticks for selecting students and working on transitions and other classroom management “tricks”. A third teacher stated that these observations focus on a broad spectrum of topics such as scaffolding for students with individual education plans, behavior, a little bit of content knowledge but “less focused on specific math content rather than more so everything overall.” The fourth teacher noted that the administrator with non-mathematical background “is going to look at classroom environment or classroom engagement or those types of things.”

Our analysis of the written observation protocols supported these perspectives. It was evident from the written documents that all of the classroom observations took place in middle school mathematics classrooms because of the reference to instruction but there were some differences in the mathematics comments between the written documents. Particularly, observers with mathematics backgrounds were equipped to infer about the development of the mathematics. Examples of these inferences on written documents include,

- Students were asked questions that required them to draw on prior knowledge and connect new learning to prior learning. Examples: What does the quotient tell us? What property does this represent? Does this look similar?

- Students were able to readily manipulate algebra tiles (1,-1, and -x) which indicated that the use of modeling and the use of algebra tiles has been part of instruction to develop conceptual understanding.

- Couple of the numbers were too hard (changed this in subsequent blocks)...continue to work on extension activities for higher level students and questions to extend thinking.

Because the content focused feedback was developed inductively, in most cases, there was more detailed information recorded. Much of the written narrative from administrators with non-mathematical backgrounds was in the form of scripted action or discourse. Some examples from these forms include,

- [teacher] reviewed properties. Student raised hands to volunteer to answer. [teacher] reminded students of strategies (always in same
order) to remember strategies...they raised their hands to volunteer and share...they struggled a bit in that transition...classroom is organized and tidy.

you consistently incorporated 21st century skills in your delivery. It is evident that students enjoy your class, understand the content and are able to apply what they know. The learning environment you have created challenges students and is actively engaging.

Administrators’ Perspectives
All administrators indicated that there is a difference in the level of discipline specific feedback they provide when they are conducting observations outside of their content area than when they are observing in their own field. They noted the value in collaborating with other administrators or teachers in each discipline to support their understanding of these fields. This interdependent practice aligns with Stein and Nelson’s (2003) definition for distributed leadership and these interactions enable adaptive leadership (Uhi-Bien et al., 2007) in that, together, stakeholders work toward solving problems of practice. When asked to describe the kinds of difficulties they face in providing effective feedback, administrators commented,

My personal difficulties lie in that I don't have a math background, so in order to talk about math with someone who has been teaching Geometry and Algebra 1 for years, I have to do a lot of thinking about math that, it's not part of my background, it's not innate to me.

So that's part of one of the ways that I'm overcoming my deficiencies in math, she is the math person. I don't pretend to be able to answer a math question when I cannot, I'm ok with telling a teacher I have no idea how to explain this to a child but I know they didn't get it. Whatever you were doing didn't work, so lets talk about how it could go differently. ... I think that because I'm honest with teachers about, I'm not a math expert, it just works out OK.

...for me probably one of my most challenging was oral languages. I had no background in it. So I felt, in that case, I couldn't give them content feedback so ...that's when I called a lead teacher specialist from central offices and ... we would do the observation in tandem but then often talked about it together so that lead teacher specialist in world language would say...look for these types of things. ...there are usually resources within your division to help you if you've been given a department which you really it's not your background to try to build that capacity to give
me full feedback. ...instructional strategies, student engagement, that would be, I would say that would be more where I probably would end up giving more feedback in that.

These administrators referenced their abilities to provide guidance about general best practices with regard to classroom management and instructional strategies. In their experiences, these administrators have also found success translating their expertise and experiences in other subjects to the mathematics classroom. This practice illustrates these leaders’ use of postholing (Stein & Nelson, 2003) in that they have deep understanding in at least one discipline or teaching practice and by drawing from this understanding, and collaborating with their mathematics peers, they are able to build a knowledge base for providing feedback in to mathematics teachers. The administrator’s comments below illustrate these processes and perspectives.

...I don’t see talking about math with teachers that much different than talking about other subjects because good instruction is good instruction. The strategies that I would see working in a math class I would see working in other classes to.

So if I were in an English class or a Science class. I think a lot of it goes with student engagement, ...how engaged the students are and then the techniques that I use in math you can also use, you can do your gallery walks and your fish bowls, you can do them jigsaws all across so being able just to use and look at the student engagement and how to better engage from an instructional standpoint.

[in classroom outside of my content area, feedback is focused on]... instructional strategies, student engagement.

Administrators indicated difficulty in providing feedback outside of their content area (math or otherwise) and used their expertise in instructional strategies and classroom management to parlay this challenge into beneficial feedback for the teachers. These administrators recognized that when working with teachers from different disciplines than their own, they need to draw from other colleagues expertise. Because they leave the content expertise to a peer, their focus is placed on pedagogical and behavioral aspects of instruction.
Teachers Feedback Preference
The teachers appreciated both forms of feedback for different reasons. They were particularly enthused about receiving suggestions or commendations that focused on the mathematics content and recognized this as critical to their instruction. Teachers noted that observers with math backgrounds provided specific suggestions for improving instruction and these observers also acknowledged the positive aspects of the mathematics in the instruction.

...she definitely has a math background and she touched on a lot of the content. She said you know I loved that you said this about the content and you could tell that it was very strong, I feel like maybe there is a little bit more recognition of my content knowledge by somebody who is a math background recognizing the way that I'm saying things, how I'm saying things, how I'm scaffolding things. Maybe being able to recognize the, the thought that I put into how I conduct my lessons based on the math content. So maybe it's, the feedback is not any less significant by those who aren't math content related but there are certain things that are capitalized on and are more noticed by those people than I guess the ones who are not.

...there needs to be a part where someone with a math background walks into my classroom and actively talks to me about the quality of my instruction.

I put so much thought into how I'm instructing and thought into how am I going to get these kids to understand the math content that is like my main goal, I do like it when someone who does have a math background so that they can either share specific examples of how they taught that or how they would teach that or just recognizing how I'm teaching the content. So I do, I think I do prefer someone with a math background and I do think that sometimes things are noticed more by the math people, like whether it's an assessment or a warm-up, noticing that was a really great math content that you pulled in there and how you pulled that in.

While teachers appreciated math specific feedback, they also saw great value in pedagogical and behavioral feedback as well. Teachers noted that the administrators noticed different aspects of the mathematics instruction than they would have recognized themselves and they broadened the teachers’ understanding of
instructional strategies. There is consensus among administrators and teachers that feedback takes on a different focus based on the lens of the observer. Administrators use strategies to help them provide the most useful feedback they deem possible while teachers appreciate receiving both forms of feedback and make use of these forms for different purposes.

**Discussion**

This exploratory study looked at the nature of feedback provided to middle school mathematics teachers from observers with different content expertise. The findings extend the research literature pertaining to discipline specific feedback, particularly in mathematics education (Nelson & Sassi, 2000). Through the lens of leadership content knowledge and leadership complexity theory, we found that administrators use their subject specific past experiences to develop feedback to teachers which supports current research (Lochmiller, 2016) and their evaluative roles influence the depth and form of feedback that teachers receive.

In this study, we recognized forms of administrative, enabling and adaptive leadership (Uhi-Bien et al., 2007) in the ways that observers approached the task of providing feedback. In particular, administrators were required to submit a pre-designed protocol which influenced the feedback that they provided to teachers and illustrated a form of administrative leadership. Concurrently, some observers provided teachers with comprehensive, specific feedback in both written and oral form which enabled teachers to reflect on their instruction and in some cases, held potential for adaptive leadership. Uhi-Bien et al. (2007) define adaptive leadership as “a collaborative change movement that emerges nonlinearly from interactive exchanges” (p. 306). Indeed, we observed these interactive exchanges between teachers, observers and administrators and recognized the potential for adaptive change resulting in the form of instruction from these exchanges.

We speculate that the difference in the inductive and deductive approaches that observers took to documenting classroom activity was, at some level, attributed to the observers’ expertise in the content area. Because the pre-designed observation protocols did not include discipline specific standards, it is possible that the observers, with mathematical backgrounds, were interested in capturing the development of the mathematics and student learning of the mathematics knowing that this could later be
translated into more generic terms for the purposes of the evaluation protocol, hence, and inductive approach. In the same vein, administrators for whom mathematics was not their formal discipline may have used the evaluation protocol as a framework to direct their, deductive, observations because they were interested in observing non-discipline specific instructional strategies.

Our findings support current research citing teachers preferences for specific, concrete feedback (Price, Handley, Millar, & O’Donovan, 2010; Northcraft, Schmidt, & Ashford, 2011). All teachers, in our study, expressed a need for specific feedback that can be used to inform their instruction. Along these lines, teachers noted their appreciation for content-specific feedback indicating its immediate impact on instruction. Furthermore, observers noted the importance of oral feedback for attending to the social emotional needs of the feedback recipient; this finding aligns with current literature (Rowe, 2010). Even in cases when oral feedback was not required by the school division, administrators engaged in post-observation discussions with the teachers. One of the teachers in this study explained that when student scores are high and there is not an identifiable problem, teachers received very limited feedback. Collins (2004) also reported a similar finding and noted the teachers’ preferences for receiving feedback, regardless of whether or not this feedback was positive or more constructive.

The findings from this study most notably point to the difference in the nature of feedback to middle grade mathematics teachers from observers who have formal mathematics education or experience and those who have a different subject background. Similar to Nelson & Sassi’s (2000) findings, observers in this study who had mathematics education or experience focused on the development of mathematical ideas while the other observers looked at structure or behavioral aspects of the lesson. Furthermore, the kinds of feedback that mathematics-focused observers provided included content focused pedagogy which indicates that content and pedagogy are intertwined and unique to each discipline (Nelson & Sassi, 2000). Stein and Nelson (2003) purport that administrators do not need to be experts in all subject areas, rather a distributed approach to leadership yields a solution for leading teachers in various disciplines. In each of our cases, observers called upon their subject matter expertise, whether that was in mathematics, special education, counseling, or science to provide instructive feedback to teachers. Administrators conducting observations
outside of their content expertise employed postholing (Stein & Nelson, 2003) to help them make the needed connections between content and pedagogy. Observers with mathematical background provided detailed feedback focused on content while also integrating pedagogy.

This study provides evidence that further research is needed in examining the nature of feedback that is provided to teachers from observers with different content backgrounds and administrative roles. Feedback has implications for teacher development and, in turn, student achievement; as such it is critical that teachers receive productive oral and written discourse from their observers. This study was limited in that we were unable to observe the post-observation meetings between teacher and observer and therefore, could not record the oral feedback. Obtaining this form of data would greatly impact the robustness of a study like this one and complete the picture for the full spectrum of feedback that teachers receive. Despite this limitation, the findings indicate a need for a closer look at the type of subject specific preparation observers and administrators receive. Additionally, this study provides evidence for the importance of employing mathematics specialists in non-evaluative roles alongside administrators to provide teachers with multiple perspectives of their instruction.
References


Appendices
Appendix A

Background Survey
(administered using Survey Monkey)

1. What is your gender?
   M ___   F ___

2. How old are you?

3. How would you describe your position?
   a) Principal   b) mathematics specialist or mathematics coach
   c) Superintendent or Assistant Superintendent   d) other

4. Do you have administrative responsibilities for more than one school (if so, please state how many)?
   a) 1-3   b) 4-7   c) 5-9   d) 10 or more

5. What is the highest level of formal education you have completed?
   Ph.D. or Ed.D. ____   Masters Degree ____   Bachelors Degree ____   GED ____
   Other:

6. What content area (e.g. Mathematics, English, Psychology etc...) did you study for your undergraduate major?
   For your graduate work?

7. How many years experience do you have working as an administrator?
   a) 0-2   b) 3-5   c) 6-9   d) 10 or more

8. How many years experience do you have working as an administrator at this school?
   a) 0-2   b) 3-5   c) 6-9   d) 10 or more
9. What certifications and licensure do you hold?

10. How many years did you spend as a subject/class teacher before you became an administrator?
   a) 0-2           b) 3-5           c) 6-9           d) 10 or more

11. What subject(s)/classes did you teach before becoming an administrator (please specify the number of years for each).
Appendix B

Teacher and Administrator Interviews

Administrator Interview Questions

i) Can you describe the goals of the Teacher Evaluation System that your district uses (particularly the observation protocol)?

ii) Can you describe for me the process you use when developing feedback to teachers?

iii) How does this process differ when providing feedback to different teachers?

iv) After having observed teachers for ‘x’ number of years, can you describe what you have learned about providing effective feedback? How did you learn this (e.g. professional development, observations, personal experience etc...)?

v) Please describe some characteristics of effective feedback for middle school mathematics teachers. Why are these characteristics of effective feedback?

vi) Please describe some of the difficulties in providing effective feedback to teachers.

vii) Do you find written or oral feedback more productive and in what ways?

viii) Please describe what you hope your feedback does for the teachers that you observe.

Teacher Interview Questions

i) Can you describe the goals of the Teacher Evaluation System that your district uses (particularly the observation protocol)?

ii) Can you describe for me some characteristics of evaluation feedback that you find most effective and why do you find these characteristics most effective?

iii) Please describe if and how you use post observation feedback in your teaching.

iv) Do you find written or oral feedback more productive and in what ways?

v) How has your perspective on evaluation feedback changed over the course of your teaching career?

vi) Please describe differences you notice in feedback from observers with different content knowledge or experiential backgrounds.