Nebraska Educator Perceptions on the Quality of Instructional Feedback in a Secondary Science Classroom

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NEBRASKA EDUCATOR PERCEPTIONS ON THE QUALITY OF
INSTRUCTIONAL FEEDBACK IN A SECONDARY SCIENCE CLASSROOM

By
Megan Myers

A DISSERTATION
Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Education
Major: Educational Administration
Under the Supervision of Dr. C. Elliott Ostler
Omaha, Nebraska
May, 2018

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NEBRASKA EDUCATOR PERCEPTIONS ON THE QUALITY OF INSTRUCTIONAL FEEDBACK IN A SECONDARY SCIENCE CLASSROOM

Megan Myers, Ed.D.
University of Nebraska, 2018
Advisor: Dr. C. Elliott Ostler

Abstract

The practice of providing feedback to teachers through the process of teacher evaluation is designed to improve the quality of instruction at the classroom level. However, there is a dearth of literature concerning how instructional leaders can best support teachers, and what types of feedback are beneficial to improvement. Secondary science education presents a unique challenge to instructional leaders as it is rare to have content experts represented at the administrator level. Few supports exist for administrators who are not science content experts, consequently lending little assistance to the science specialists in the classroom, aside from available outside workshops and resources. This absence of content support for both administrators and science teachers contradicts the idea of Stein and Nelson’s nested learning community (2003) in which content is located at the center of all teaching and learning interactions.

The purpose of this study was to examine perceptions of both secondary science teachers and their administrators to explore the current state of feedback in a secondary science classroom, and what that feedback needs to look like to support the professional growth of highly specialized educators. The concurrent mixed methods study surveyed 26 science teachers and 12 administrators from four high schools across the state of Nebraska to gather perception data. Both qualitative and quantitative data from resulting
survey completions showed that secondary science teachers value feedback from their evaluating administrators for purposes of professional growth in the classroom. This feedback should include both content-neutral and content-specific components of teaching, as some science teachers felt a greater need for pedagogy-related suggestions while others wanted more directive feedback on strategies connected to their specific activities and how students are grasping the science learning. Over half of the science teacher participants recognized a need for both types of feedback for growth.

Secondary administrators both viewed themselves and were deemed capable of providing content-neutral feedback, but were found (by science teachers and themselves) to be lacking in ability to provide content-specific feedback in a secondary science classroom. These results call for additional supports for administrators with regard to the provision of specialized content feedback. In light of the Nebraska College and Career Ready Standards for Science coming in the spring of 2018, the timing is right for providing more science-specific supports to both secondary science teachers and their evaluating administrators.
Acknowledgements

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Chapter 1: Statement of the Problem

Contextual Framework

Coming from a non-traditional teaching background, I started my teaching career as a content expert on a provisional certification, working toward an end goal of certification by taking two years of online classes. I began teaching less than a month after I was hired, stepped into a high school science classroom for the first time since I had graduated from high school, and actually “student taught” in my own classroom with my own students. The first three years I taught were an amazing whirlwind of an experience for me. I was a part of a supportive science department, as well as a collaborative 9th grade team that met weekly to discuss common students of concern. I had a wonderfully supportive evaluative administrator, who visited my classroom multiple times a year and offered feedback on general pedagogy that was, quite honestly, my weakness, as a content expert. This was feedback I took to heart, because while it was generic in content, it helped me make sure I was putting my best foot forward for the sake of my students on a daily basis.

I was tenured after my third year of teaching, as goes the probationary process, and put onto our district’s three-year evaluation cycle, which included two years of self-directed evaluation in which I set and analyzed my progress toward independently-chosen goals, followed by a year of formal evaluation during which I was evaluated by an administrator and then given feedback. As I progressed through my first tenured evaluation cycle, I transitioned from being evaluated multiple times a year as a probationary teacher to receiving no feedback until mid-way through my third year as a tenured teacher (year 6 overall), where I was observed one time and then given feedback toward the end of the school year. This was the district’s top-down approach to
evaluating teachers, and seemingly built more for the purposes of teacher accountability than for instructional development. As a specialist teacher, I no longer belonged on a collaborative team within the science department. I worked diligently to become a better teacher from year to year, but often felt alone in such endeavors. I was aware that the demands placed on administrators, along with a consistently growing staff, put pressures on them to support as best they could. I knew it was not possible for them to continually be a presence in my classroom to fill my bucket with compliments. However, I still yearned for some sort of recognition or conversation that would work to both push me farther and give me some vindication for the efforts I had put forth.

I began to feel frustration and disappointment with the process of teaching and the science content I loved so much. I had, at least by my standards, stagnated in the classroom and yearned for the excitement I once felt discovering science alongside my students. For several years, I was on an island, attempting to improve my classroom practices, with only my ideas and determination to guide me. I yearned for an outside eye and some feedback to help me enhance my abilities to connect the content to my students, but my colleagues were as strapped for time as myself, struggling to keep up with the daily grind, using every minute of their plan periods and then some. In the isolated events where I was able to brainstorm ideas with a colleague here or there, I came away with ideas that pushed my teaching forward and challenged my students in ways I had not considered on my own.

What I desired was continuous growth in a career that I loved, and the feeling that I had been successful in improving my teaching skills over time. In the seven years since achieving tenure status, I had been evaluated two times, with no outside presence in
my classroom by colleagues or administrators aside from official classroom
observations. On both evaluation occasions, I sat down with a content-expert
administrator toward the end of the school year to review my official appraisal form and
was told that I had done an excellent job. While that created a sense of pride in my work,
I was given no feedback for improvement or an opportunity for self-reflection over any
particular topic or teaching strategy used during the observation. Questions began to
form in my mind about what quality feedback should look like in a specialist’s classroom.
What kind of actionable feedback would be helpful to teachers in their desire to grow
professionally? Was I alone in my longing for feedback because of my non-traditional
pathway into secondary education? Did my specialization within the sciences limit the
feedback that even content experts could offer? What did other teachers want from their
instructional leaders? Did those instructional leaders have the capacity to deliver? This
is where I began the latest stage in my educational journey and search for answers, with
a hope of identifying supports necessary for either secondary science teachers or their
evaluating administrators in the provision of quality feedback to improve instruction.

Introduction

The goal of providing feedback in an educational setting is to help teachers grow
as professionals and improve their effectiveness in the classroom (Feeney, 2007). One of
the venues for providing said feedback is the teacher evaluation process, highlighted by
Coleman (1992) as one of the essential components for creating school excellence. For
years, classroom teachers have been identified as the most important component in
influencing student achievement, with administrators coming in second (Radinger, 2014;
Wright, Horn, & Sanders, 1997). For this reason, the examination and reform of teacher
evaluation practices has frequently found a center stage in educational research. Much of
the literature concerning teacher evaluation is focused on the generalities that exist between classroom teachers within evaluative frameworks (Danielson & McGreal, 2000; Marzano, Frontier, & Livingston, 2011) and calls for reform of evaluation practices (e.g., Darling-Hammond, 2013; Marshall, 2005; Weisberg, Sexton, Mulhern, & Keeling, 2009). There are few studies focused on feedback interactions that occur between administrators and the teachers they supervise within the evaluation process, and what those interactions should look like to enable teacher growth. Examining perceptions of both those receiving and providing feedback identifies a clear gap in the literature (Radinger, 2014; Roberge, 2014), and when the setting is further specialized to a secondary science classroom, the gap concerning how administrators can support student learning with improvements in science instruction widens considerably (Lochmiller, 2015; Lochmiller & Acker-Hocevar, 2016; Lochmiller, Huggins, & Acker-Hocevar, 2012; Theoharis & Brooks, 2012).

In their *Handbook of Instructional Leadership*, Blase and Blase (2004) discern that teachers need considerable help and support to continue growing as professionals in the classroom. They rely on instructional leaders to be their “critical friends,” to “hold up a mirror” in evaluating their teaching, which can act to improve and increase self-reflection, reinforce strengths, innovation, instructional variety, careful planning and preparation, as well as enhanced focus, motivation, self-esteem, efficacy, and security (Blase & Blase, 1999; 2004, p. 37). In this manner, instructional leaders serve a pivotal role in providing the feedback that creates the connection between a teacher’s actions in the classroom and their ability to “see” these actions from an outside point of view. It is
this view of themselves in the metaphorical feedback mirror that leads to self-reflection, the acknowledgement of strengths, and the identification of areas of needed growth.

In a meta-analysis of various factors influencing education and student achievement, Hattie and Timperley (2007) found that feedback had an average effect size twice that of other factors examined, thus adding credibility to the research on the importance of the feedback process. However, feedback is only effective if it is perceived as sincere and appropriately connected to the learning process. Feedback perceived as disingenuous or disengaged from student learning within the classroom can actually result in resistance to suggestions made and reduced teacher capacity (Feeney, 2007). The format in which feedback was offered also influenced perceptions of the value of the feedback. For example, simply checking boxes on an observation sheet did not provide feedback that was purposeful for making improvements in classroom teaching (Van Soelen, 2013). Teachers preferred feedback that was communicated both verbally and in a written manner. Timeliness was also concerning as teachers typically did not receive feedback until the end of the school year, when it was too late to implement any changes, thus making the suggestions offered less purposeful (Marshall, 2003).

An additional complication of providing feedback to teachers involves that of the content being covered. Historically, instructional leaders have been trained in a content-neutral mindset, which acts to separate the “unique aspects of specific subjects or disciplines” from leadership actions (Lochmiller, 2015, p. 28). The idea behind this separation is that administrators have limited specialist knowledge, dependent upon their content area of teacher certification, but will be expected to guide the teaching and learning within any classroom in their respective buildings. Training an administrator in
content-neutral, basic pedagogical “look fors” enables them to support a variety of classrooms and content areas. That being said, much of the literature on teacher evaluation and feedback has continued this separation between content and leadership through an unintentional meld with the cultural climate of instructional leadership (Lochmiller & Acker-Hocevar, 2016).

Popular evaluation instruments from Charlotte Danielson (Danielson & McGreal, 2000) and Robert Marzano (Marzano, et al., 2011) offer rubrics with general “look-fors,” which are not designed to rely on the content expertise of the administrator, but to allow a generalist evaluator to enter a variety of classrooms of various grade levels and evaluate the basic pedagogical skills of any teacher (Lowenhaupt, McNeill, Fagan, & Katsh-Singer, 2017; Wise, Darling-Hammond, McLaughlin, & Bernstein, 1985). Because of the commonly accepted mindset that good teaching in one discipline equates to good teaching in another, there is little research focused on the practice of providing content-specific feedback to teachers in general, but much less at the secondary level (Khachatryan, 2015; Lochmiller, 2016; Lochmiller, et al., 2012). While an efficient and perhaps realistic mode of teacher evaluation when it comes to administrator expertise, some researchers have questioned whether content-neutral approaches to evaluation and feedback offer enough guidance to help teachers continue to grow professionally once they have passed their probationary teaching years, causing them to ask the question: Is quality content instruction more than just good pedagogy?

Research conducted on content-specific teacher evaluation and feedback has been focused at the elementary level, and little is known about the type of feedback that is necessary for improvement in instruction, regardless of content specialization
Traditional training in instructional leadership has been based on content-neutral pedagogy, although it is not clear whether feedback focused on general classroom management is successful in helping teachers grow on a professional level. The degree of specialization that occurs as students and teachers progress from elementary to secondary education adds an additional complication as administrators cannot be expected to be content experts in every subject matter taught (Adams, et al., 2015; Khachatryan, 2015; Lochmiller, 2016; Stein & Nelson, 2003). The challenge of providing quality feedback in a specialized setting such as a science classroom, when few administrators identify with or show proficiency in the content area (Khan, 2012; Lochmiller, 2015) is not a trivial one. For non-content expert administrators, who have no background or training in the specific content area, providing content-neutral feedback might be the only option, especially in the sciences where the vocabulary alone can resemble a foreign language in itself. However, if a teacher’s understanding and connections to his/her planning and teaching methods is through content-specific experiences, then feedback devoid of content would seem nonsensical (Grossman & Stodolsky, 1995). The emphasis then becomes one that highlights the type of feedback necessary for teacher growth in a specialized field and the capacity of administrators to provide such feedback.

With the adoption of Nebraska College and Career Ready Standards for Science in the spring of 2018 that mimic the Next Generation Science Standards (NGSS), the gaps that exist in the literature surrounding teacher evaluation and quality feedback specific for secondary science classrooms have been exposed. The NGSS approach to teaching involves a considerable shift in traditional science pedagogy with more hands-
on, inquiry-based science becoming the new norm to observe in a secondary science classroom (Rasmussen, 2017). NGSS will require more teacher capacity in terms of content knowledge, as well as a supportive environment to make this shift in pedagogy successful (Fricke, 2008). There is currently a gap in the literature on how administrators can best provide this support in such a specialized setting (Khachatryan, 2015; Lochmiller, 2016; Lochmiller, et al., 2012). Science teacher perceptions of the type of feedback that helps them grow professionally will guide our next steps in providing necessary supports. Administrator perceptions of self-efficacy when it comes to providing quality feedback in a content area outside of their expertise will help shape awareness for the growth and training that is necessary at the instructional leadership level. By exploring the need for additional supports and development needed in the science classroom, school administrators can learn to offer quality feedback to science teachers, enabling them to grow in ways that will impact student achievement as well as science education in a positive manner.

Conceptual Framework

The current study focused on how leadership actions can influence both teachers and students as it pertains to the content area. To illustrate this connection, Stein and Nelson (2003) developed a positional theory of leadership examined through nested learning communities that highlights roles taken on by district leaders, principals, and teachers alike to both lead and learn alongside one another through various levels of interaction (see Figure 1). Before delving into the specifics of each circle in the nested learning community, two key terms must be introduced that will play a major role in the
framework that shaped this study, namely pedagogical content knowledge and leadership content knowledge.

Traditionally, basic pedagogy rather than content has served as the focus for attempts to create a common language for teacher evaluation. The goal of the generalities was to provide administrators as evaluators with the proper tool to utilize in any classroom for offering feedback to teachers. Content-neutral characteristics of the classroom such as classroom management, activity organization, time management and pacing, student-teacher interactions, levels of questioning, planning and preparation, and assessing student understanding became the cornerstones of effective teaching and the characteristic “look fors” when observing a classroom for evaluation (Shulman, 1986). Shulman referred to this absence of content as the “missing paradigm” and coined the term, pedagogical content knowledge, which incorporated both pedagogy and content to enable discussion on how students learn specific subject matter, as well as what makes learning certain topics tougher than others and where student misconceptions can be found (p. 7). This idea of pedagogical content knowledge is still a topic of consideration in today’s views of teacher evaluation and whether content-neutral feedback is adequate for specialist teachers, especially at the secondary education level.

Related to Shulman’s missing paradigm of pedagogical content knowledge, Stein and Nelson (2003) coined the term leadership content knowledge as the “knowledge of academic subjects that is used by administrators when they function as instructional leaders” (p. 423). Leadership content knowledge was also described as a missing paradigm in terms of school and district leadership, with the understanding that even as administrators moved away from learning at the student level, the teaching and learning
should always be rooted in content: content knowledge, how the content is learned by adults and students alike, and how the content is taught. Figure 1 was adapted from Stein and Nelson (2003) to illustrate their positional theory of nested learning communities.

The subject matter or the content (Circle 1) is located at the heart of the teaching and learning process at every level. At each successive level exists a teaching and learning dynamic that varies based on distance from the subject matter. In Circle 2, the teachers teach the students in a way that not only highlights the teacher’s content knowledge, but that connects the content to pedagogy, and is labeled PCK for the pedagogical content knowledge that is being utilized at this level in the learning community. In the second circle out from the content core (Circle 3), the school principals become both the leaders and teachers, while the teachers become the learners. This does not always mean that the administrator is teaching new knowledge, but could be looking for more connections to make or resources to provide to help teachers further connect to the circle in which they are imparting their pedagogical content knowledge to their students. Circle 4 involves district leaders teaching the collective whole, which includes principals, teachers, and even other central office staff members. Larger circles encompass and impact everything within, with the subject matter always at the core of the nested learning community. This study focused on how leadership and teaching actions in Circle 3 can influence everything contained within the smaller circles (Circles 1 and 2). Circle 4 is outside of the realm of this study.
According to this idea of a nested learning community, administrators interested in continuous growth for the specialist science teacher, for example, need to understand the pedagogical content knowledge involved, or how to connect the practice of teaching to the science itself, as well as the best ways of teaching science concepts, how students master scientific ideas, and effective ways of teaching adults as professional educators. “Without knowledge that connects subject matter, learning, and teaching to acts of leadership, leadership floats disconnected from the very process it is designed to govern” (Stein & Nelson, 2003, p. 446). This idea of leadership within the nested learning community is that of an instructional leader forming a connection with the classroom.
teacher, all within the context of the content covered. This connection could be accomplished through the teacher evaluation process of offering feedback to teachers following classroom observations. The determination of what quality feedback looks like in a science classroom both shapes and is shaped by teacher and administrator efficacy in terms of expertise in the content area and experience in the classroom setting, teacher perceptions of administrator efficacy and the feedback process, and administrator perceptions of teacher efficacy and the feedback process.

Receiving quality feedback shapes the environment for continuous growth and development for teachers as professional educators. As Blase and Blase (2004) suggest, growth without such supports is highly unlikely, except for extremely motivated individuals. The secondary science classroom is just one example of a specialized secondary setting that presents a challenge to administrators in providing content-specific feedback. As teachers and content become departmentalized, compartmentalized, and more and more specialized, administrators fall back on their generic training and content-neutral approach to feedback to support their teachers in the best way they can. While some researchers contend that content should be a consideration for feedback as early as the elementary education level (Burch & Spillane, 2003; Spillane, 2005), the high school setting creates a unique environment for providing feedback. For the first time in a child’s education, high schools are organized by content departments instead of by grade levels. Within each department, content is further compartmentalized into specialized courses that expert educators may teach for years at a time. Methods courses in secondary teacher preparatory programs focus on subject matter taught, teachers connect with content-specific professional organizations and workshops, and identities are created in
which content is king (Grossman & Stodolsky, 1994; 1995). Content creates the context in which teachers differentiate themselves from other subjects by presenting content to students using their unique pedagogical content knowledge. A traditional high school administrator unaware of these cultures of content might attempt to evaluate such a teacher, offering content-neutral feedback that may not be viewed as purposeful to the teacher. If secondary teachers operate under the context that content areas in a high school setting are not interchangeable (Grossman & Stodolsky, 1995), then how teachers perceive content-neutral feedback during the evaluation process might be affected (Lochmiller, 2016). Stein and Nelson (2003) suggest that “it is not adequate for administrators to generalize from what they know about learning and teaching in one subject to another. The nature of the subject, itself, matters, and has implications for teaching and learning in that subject” (p. 443). On the flip side, considering the amount of specialization that occurs in a high school setting, with a variety of specialty courses within just one content area, is it realistic for high school administrators to ever have an adequate amount of expertise to offer content-specific feedback to all specialist teachers?

**Problem Statement**

With Nebraska College and Career Ready Standards for Science becoming a focus in the spring of 2018, do educators in the field perceive the need for more specialized supports to grow professionally? This mixed methods study will examine perceptions of both secondary science teachers and their administrators to explore the current state of feedback in a secondary science classroom, and what that feedback might look like to support the professional growth of highly specialized educators.
Research Questions

This study will focus on feedback and administrator capacity in a specialized setting. A mixed-methods research design examining perceptions and needs for both those receiving (teachers) and providing (administrators) feedback in a secondary science classroom setting will be used to address the following questions:

Main Research Question: What are qualitative and quantitative indicators that define quality feedback from an administrator to a secondary science teacher?

Sub-Research Question 1: What type of feedback, as demonstrated through TEES-F completion, do secondary science teachers report needing for professional growth to occur?

Sub-Research Question 2: How, as demonstrated through TEES-F and ASES-S completion, does content-specific feedback differ from content-neutral feedback in a secondary science classroom?

Sub-Research Question 3: How and to what degree, as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-neutral feedback?

Sub-Research Question 4: How and to what degree, as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-specific feedback?

Sub-Research Question 5: How and to what extent, as demonstrated through TEES-F completion, do secondary science teachers perceive their satisfaction with feedback offered through teacher evaluation?
**Sub-Research Question 6:** How and to what degree, as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-neutral feedback to science teachers?

**Sub-Research Question 7:** How and to what degree, as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-specific feedback to science teachers?

**Definition of Terms**

- **Quality feedback:** “Specific and elaborate, targeting at specific, observable behaviors that can be changed or adapted to improve task performance” (Govaerts, van de Wiel, & van der Vleuten, 2013, p. 108). The concept of quality feedback was specifically referenced by TEES-F questions 2, 3, 4, 5, and 6.

- **Content-neutral:** “A set of generic leadership actions that are disconnected from the unique aspects of specific subjects or disciplines” (Lochmiller, 2015, p. 28). Content-neutral references were made in TEES-F questions 5, 7, 10, 11, 14, 16, and 24.

- **Content-specific:** Although not specifically defined in the literature, I refer to this as a set of leadership actions intertwined with specific subject areas. Content-specific references were made in TEES-F questions 6, 8, 12, 13, 15, 17, and 25.

- **Evaluator competence:** “The ability to make sound judgements about teaching quality and the ability to make appropriate, concrete recommendations for improvement of teaching performance” (Wise, et al., 1985, p. 86). The concept of evaluator competence was specifically referenced by TEES-F questions 10 and 12.
• **Content expert:** An individual will be considered a content expert if their teaching certification is within a science field. TEES-F referenced the idea of a content expert in questions 16 and 17.

• **Non-content expert:** An individual will be considered a non-content expert if their teaching certification is in a content area other than science, regardless of the individual’s years of experience supervising and supporting in a science classroom. TEES-F questions 14 and 15 referenced the non-content expert specifically.

**Significance of Study**

The major contribution my study makes to the realm of education and instructional leadership practices will be to determine whether subject matter is important to consider when evaluating teachers and providing quality feedback in a specialized secondary classroom. Mixed views currently exist on whether more content training should be offered to administrators or if general pedagogical practices can be trusted to transcend content specializations (Lochmiller, 2015; 2016). As it stands, there is little research illustrating what type of feedback will result in teacher growth (Khachatryan, 2015), and even less examining what that feedback should look like in a science classroom or at the secondary level in general (Lochmiller, 2015; Lochmiller & Acker-Hocevar, 2016; Lochmiller, et al., 2012).

In conducting mixed method questionnaires of secondary science teachers, the results of my study highlight current teacher perceptions of the feedback process as well as the usefulness of the feedback offered in a science classroom. Responses offered by content specialist teachers identify what classroom experts want regarding feedback that
is purposeful and actionable to them, as well as what else they need to continue growing in terms of professional development. Are generalist classroom management observations sufficient for content experts or is content engagement essential for feedback conversations to have perceived value?

By examining administrator perceptions of the feedback process and how content-neutral feedback differs from that of content-specific, my study clarifies whether administrator self-efficacy and leadership actions are affected by the complexities of the science content and how administrators perceive their capacity to support secondary science teachers in the classroom. As researchers rarely examine content-specific instructional leadership (Lochmiller, et al., 2012), administrator perceptions at the secondary level are key to answering this question. Is there a need for content-specific trainings or tools to improve administrator efficacy in a secondary science setting? If administrators with content expertise are seen as more credible sources, as suggested by Lochmiller (2016), do administrator trainings lead to greater teacher buy-in during feedback discussions? Does this equate to higher quality feedback about teaching within a science content focus, resulting in greater teacher growth and student achievement in the areas of science education? My study offers perspectives into what quality feedback can and should look like in a secondary science classroom and how that can be beneficial for teacher growth in a professional setting.

**Delimitations**

Teacher and administrator perceptions collected from this study might not apply to schools and districts who employ specialized instructional coaches in their staff. Instructional coaches, as is the purpose of their position, may provide focused, content-
specific feedback in working with teachers that is not applicable to the level of administrator feedback. Additionally, the results from my study were focused in a single content area at the secondary education level, and it is not clear whether data collected in this study will be applicable to other content specialties as well as varying levels of education. Finally, data collected in this study were from science teachers and administrators across Nebraska from solitary Class A high schools within each of the four chosen districts. The size of the high school, the number of science teachers and administrators, and the fact that there are no other high schools within each district to collaborate with might have affected teacher and administrator mindsets as it pertains to professional growth in the classroom.
Chapter 2: Overview of the Literature

This chapter will offer a review of the literature to help justify the current study. The review of the research supporting this study will be organized into four major categories, including a discussion of the literature relating to teacher evaluation and the process of providing feedback, content-neutral feedback and leadership actions, content-specific feedback and leadership actions, and the unique challenges of providing feedback in a secondary science classroom.

A Teacher-Focused Approach

The classroom teacher has been widely touted as the most important resource affecting student achievement (Radinger, 2014; Wright, et al., 1997). This idea makes sense because the classroom teacher works directly with each student on a daily basis, expending determination and grit to impart their knowledge. Efforts to improve education systems often find that focusing on the development of classroom teachers has proven to be the most effective route of successful reform (Goodwin, 2010; Wright, et al., 1997). Instructional leadership actions, like the utilization of the teacher evaluation process, provide a tool for the supervision of classroom teachers, and the provision of quality feedback, leading to improvements in instructional practices. Although they only spend about 12.7% of their time on instructional leadership actions, the time that is spent on coaching, evaluation, and curricular improvements lead to greater student achievement (Grissom, Loeb, & Master, 2013). “Truly meaningful and effective teacher evaluation is one of the keys to excellence in school and should be the principal’s highest priority” (Coleman, 1992, p. 24).
Teacher Evaluation and Feedback

Research in the literature identifies two main purposes of teacher evaluation: accountability and instructional development (Danielson & McGreal, 2000; Donaldson & Papay, 2014; Marzano & Toth, 2013). Accountability is often discussed in terms of personnel decisions, while improvements in instruction make themselves known through gains in student achievement (Marshall, 2005). Teacher evaluation is also discussed on the level of the individual as well as that of the school. For example, instructional improvements on the individual level might include individualized professional development, while accountability would involve decisions about a teacher’s job status. Correspondingly, the organizational level involves large-scale schoolwide improvement on instruction and accountability measures that involve school status and accreditation decisions (Darling-Hammond, Wise, & Pease, 1983; Wise, et al., 1985). Overall, teacher evaluation should help to support all teacher development, welcome and train newcomers to the profession, and act to weed out those failing to meet expectations regardless of supports in place.

The process of teacher evaluation is typified by an administrator performing a classroom observation, in which the administrator observes a classroom teacher for a set amount of time, then offers feedback and suggestions in some sort of post-conference setting (Darling-Hammond, et al., 1983; Kane, Taylor, Tyler, & Wooten, 2011). The goal of offering feedback is to improve the effectiveness of both the teacher and the instruction through differentiation and individualized supports (Feeney, 2007; Garnett, 2013). Feedback has been described by Hattie and Timperley (2007) as a “consequence” of performance (p. 81) whose purpose is to “reduce discrepancies between current
understandings and performance and a goal” (p. 86). In terms of teacher performance in the classroom, feedback has been defined as information that celebrates good performance while offering suggestions and supports for improving instruction (Deneire, Vanhoof, Faddar, Gijbels, & Van Petegem, 2014; Meadows, 2015). Shute (2008) describes feedback as an attempt to modify a person’s thinking and behavior in order to achieve higher levels of learning. The present study examined performance feedback offered through the evaluation process to see if supports and suggestions offered were adequate, as perceived by teachers and administrators, for instructional growth to occur in specialized secondary classrooms.

Studies in the literature suggest that successful evaluation systems are comprised of the delivery of focused and meaningful feedback to teachers (Coleman, 1992; Darling-Hammond, Amrein-Beardsley, Haertel, & Rothstein, 2012; Marzano, et al., 2011). Garnett (2013) posits that offering purposeful feedback to teachers in a timely and frequent manner can act to both create a supportive culture for teacher development and change the often perceived punitive nature of teacher observation and evaluation. Feedback has shown to be valuable in decreasing both ambiguity and uncertainty in perceptions of job performance and work environment (Ashford & Cummings, 1985). Negative perceptions of teacher evaluation have been linked not only to a lack of feedback, but a lack of administrator presence in classrooms except for those of the teachers who struggle. Literature shows that administrative focus on teacher evaluation and development of instruction through feedback conversations can have a positive result on teacher effectiveness in the classroom, resulting in increased student achievement (Blase & Blase, 2004; Feeney, 2007; Grissom, et al., 2013). Some of the positive effects
seen from feedback conversations within teacher evaluation systems include improvements in classroom instruction, increases in student learning, rising teacher awareness of best practices, a renewed sense of teacher pride, professionalism, and motivation, enriched teacher-administrator communication, better relations with teacher unions, more available funds for professional development supports, and increased public confidence in public schools (Wise, et al., 1985). Additionally, over half of the teachers participating in an international survey on teaching and learning (OECD, 2014) identified the feedback process itself as the key source of information guiding positive changes in classroom instruction. When evaluation feedback led to changes in classroom instruction instead of a lone focus on accountability, greater job satisfaction was observed.

Research suggests that feedback successful in improving teacher effectiveness typically involves a focus on detailed, specific, and observable behaviors, with the addition of constructive criticism, praise, a culture of collaboration, and availability for follow-up feedback (Blase & Blase, 1999; 2004; Feeney, 2007; Govaerts, et al., 2013; Marzano, et al., 2011; Milanowski & Heneman, 2001). Hattie and Timperley (2007) discuss various types of feedback that can focus on a task, process, self-regulation, or generalities about the self. Examination of the process required to complete a task or self-regulation aspects of teaching actions can be powerful for self-reflection and task mastery, while focusing feedback on the individual (i.e., “You have a great personality”) is less influential for improvement. Feedback that was too broad or too focused on any single level of examination was viewed as ineffective (Hattie & Timperley, 2007; Marzano, et al., 2011). Broad observations that could be applicable to any teacher in any classroom were not meaningful to teachers, while feedback that was only focused on task
behaviors, for example, was too specific to apply to the individual’s teaching practices as a whole. In addition, various styles of feedback were found to have differing effects on the feedback recipients. For instance, greater responses have been received with task-oriented feedback and information on growth than feedback connected to praise, rewards, or punishments (Hattie & Timperley, 2007). Extrinsic rewards like monetary incentives tend to undermine both performance and intrinsic motivation.

Hattie and Timperley (2007) offer three levels of consideration for effective feedback: Feed up, Feed back, and Feed forward. “Feed up” addresses the question of where the teacher is going and what goals they have for the future, “Feed back” examines the progress that is being made toward the goal at hand, while “Feed forward” helps guide the individual through the next steps necessary for continual professional growth. The process of meeting the learners where they are, examining their progression, and focusing on their next step mimics feedback considerations that teachers are encouraged to utilize with students in their own classrooms. In her discussion of formative feedback, Shute (2008) compares effective and useful feedback to a murder investigation, where teachers must have a “motive,” or a need for the feedback, an “opportunity,” where teachers receive feedback in a timely enough manner to incorporate suggestions into their current practice, and a “means,” where they are able and willing to use the feedback provided. Because of these unique considerations, it is difficult to pinpoint a universal type of feedback or process of providing such feedback that will reach all individuals (Shute, 2008).

In addition to examining the components of the feedback offered, one must also consider the mindset of the individual receiving the feedback, their previous experiences
with teacher evaluation, and their potential bias in accepting suggestions for improvement. Feedback reactions are influenced by the context in which the feedback is offered, the details of the feedback itself, and the difficulty of the concept being covered (Khachatryan, 2015). Govaerts, et al. (2013) suggest that “feedback reactions are the immediate predecessors of performance improvement” (p. 122). When feedback is received and interpreted in a positive manner, improvements in teacher self-efficacy and learning result, regardless of the type of feedback offered (Hattie & Timperley, 2007). For example, teachers were not found to object to suggestions for improvements and responded well to feedback that positively reinforced and validated their classroom teaching style.

A quality feedback cycle embedded in teacher evaluation acts as an effective professional development tool for improved instruction, encouraging a collaborative, reflective process of support for teacher growth, resulting in higher levels of satisfaction in the process of teacher evaluation as a whole (Danielson & McGreal, 2000; Donaldson, 2009; Meadows, 2015; Taylor & Tyler, 2012b). Govaerts et al. (2013) discuss a necessary cycle of feedback that must exist for these improvements to occur (See Figure 2).

**Figure 2.** Feedback cycle of performance development (Govaerts, et al., 2013, p. 107).
The feedback cycle involves teacher instruction in the classroom (Performance), administrator observations (Assessment) of the teacher in question, and the offering of feedback from the administrator to the teacher in a post-observation conference (Feedback). This process ultimately leads the teacher to interpret the feedback offered, and adjust his/her classroom performance as needed to align with administrator suggestions. Ideally, the feedback cycle would continue with a follow-up assessment of teacher performance and continued feedback by administrators to encourage professional growth of teachers through improvements in the classroom. Research shows that when the teacher evaluation process is focused on improving instructional effectiveness more so than accountability, the environment becomes a safe one in which the administrator is viewed as a coach and mentor as well as an evaluator (Danielson & McGreal, 2000), and teacher evaluation becomes “one of the most powerful ways to impact instruction” (Wise, et al., 1985, p. 76).

**Teacher Perceptions of Feedback**

Roberge (2014) conducted a study in Vermont examining 119 K-12 teacher perceptions of administrator feedback and found an overall positive reaction to receiving feedback, as teachers felt the feedback was validating to their choice of classroom organization and teaching practices. Both teacher evaluation and the feedback associated with it were viewed by teachers as purposeful and valuable throughout the study, with 47% of participants receiving what they perceived as quality feedback that was used to improve teaching practices. Seventy-three percent of teachers thought the feedback they received was helpful, while 13% viewed the process as not only unhelpful, but a waste of time. Over half (53%) of participating teachers viewed the evaluation process as essential
and valuable, and 33% saw the process as necessary for both improvement and accountability. Seventy-eight percent of participating teachers wanted administrative feedback, 82% wanted administrators to recognize and appreciate their efforts in the classroom, but only 33% of study participants actually wanted evaluators in their classrooms on a frequent basis. Teachers who did not want evaluators frequently visiting their classrooms reported feeling anxious about the idea of receiving feedback from administrators. Because of the accountability piece of the teacher evaluation process, many teachers have been found to experience anxiety from the process in general.

Overall, Roberge (2014) identified four factors that were influential in the way teachers perceived feedback received from administrators: whether the teachers felt like their administrators cared about them as individuals, the job security status of the teacher, whether the teacher felt prepared for the classroom observation and evaluation, and the amount of respect the teacher felt for the evaluating administrator (i.e., does the administrator play favoritism, elicit trust, show respect).

Research on teacher evaluation has shown positive responses to performance feedback when it is offered. The act of receiving feedback is reassuring to many, even if it plays no influence in performance improvements (Ashford & Cummings, 1983). In an examination of Cincinnati’s reformed Teacher Evaluation System (TES), Taylor and Tyler (2012a; 2012b) report positive classroom results, with data inferring that the improvements in student achievement were an indirect result of the feedback provided. Teachers involved in TES were found to be more effective at raising student achievement scores during the year of their evaluation as well as in the years immediately following evaluation. The thinking behind this phenomenon is that focused evaluator supports lead
to greater awareness by the teacher of their areas of strengths and needs for improvement, leading to improvements for a few years both during and following intensive supports. In addition, TES-connected student score increases were largest for teachers recognized as needing the most support in the classroom. This is important to acknowledge because results suggest that concentrated and focused supports for struggling teachers can be successful in making large improvements in the classroom. Although some studies suggest that gains in teacher effectiveness level off after the first few years of teaching (Garnett, 2013; Taylor & Tyler, 2012a; 2012b), research on veteran TES teachers also showed impressive gains during and immediately following evaluation years. It is not clear if this finding was a result of Cincinnati’s reformed system of evaluation (TES) or because these veteran teachers had not received feedback from administrator evaluators for an extended period of time.

Research has shown that teachers have a desire for productive, positive evaluation (Ritter & Barnett, 2016), and that this opportunity to be observed and involved in discussion and reflection concerning teaching (i.e., the feedback process) is essential for improvements in classroom instruction (Blase & Blase, 2004; Danielson & McGreal, 2000; Marzano, et al., 2011). As one teacher described in a study conducted by Blase and Blase (1999), “Feedback builds my efficacy…As I gain positive feedback, I continue using what works in the classroom. And because I do not fear negative evaluation, I am willing to take risks” (p. 361). Teachers empowered by receiving administrator feedback implemented new ideas, responded to student diversity, prepared and planned better with a renewed focus, increased the variety in their instruction, took on more challenging tasks, developed reflection, error detection, and self-feedback skills, as well as basic
gains in motivation, self-esteem, security, and professional satisfaction (Blase & Blase, 1999; 2004; Feeney, 2007; Hattie & Timperley, 2007). Some administrators reported that teachers, in response to positive feedback experiences, were taking the initiative to approach the administrator in request of a lesson observation to continue the professional collaboration (Feeney, 2007). The act of teachers proactively searching out feedback is one not commonly cited in the literature. Furthermore, Hattie and Timperley (2007) found that teachers will stop requesting feedback if the cost/benefit ratio becomes prohibitive, like if risk-taking and experimentation in the classroom were associated with receiving negative feedback or evaluation results, or if accountability measures were found to outweigh instructional development.

Despite the positive reviews concerning the teacher evaluation process and feedback in general, Marshall (2015) suggests that these previously discussed examples are the exception rather than the rule, that typical perceptions of teacher evaluation are not so positive. Along this same line of thinking, research stating that teacher evaluation has had no measurable impact on the improvement of teaching or learning in the classroom is much more abundant in the literature (Bambrick-Santoyo, 2012; Donaldson, 2009; Khachatryan, 2015; Louis, Dretzke, & Wahlstrom, 2010; Mielke & Frontier, 2012; Tschannen-Moran & Tschannen-Moran, 2011). Garnett (2013) found no significant relationships between years of teaching experience, teacher evaluation observation ratings, and 4th grade NeSA scores, although she did observe positive trending in her data. In a survey of 1,010 teachers, Duffett, Farkas, Rotherham, and Silva (2008) found that teachers generally did not have an overly positive view of teacher evaluation, with only 26% reporting a “useful and effective” result from the process. Forty-one percent
found the evaluation process to be “just a formality,” and 32% described the process as “well-intentioned but not particularly helpful” (p. 3). In her study on teacher perceptions of evaluation, observation, and feedback, Meadows (2015) found teachers and administrators similarly split with regards to perceptions of the usefulness of teacher evaluation. While 70% of teachers and administrators considered teacher evaluation useful, only 50% of teachers and 63% of administrators had positive feelings toward evaluation. These were the study participants who felt like the process of teacher evaluation and provided feedback had been successful in making direct improvements in classroom instruction.

Studies in the literature discuss concerns with the process of teacher evaluation, and evaluation results that fail to differentiate between teachers and offer little in terms of purposeful feedback. In her discussion of teacher evaluation, Donaldson (2009) draws similarities between evaluation ratings and Garrison Keillor’s fictional Minnesota town of Lake Wobegon, where “all the women are strong, all the men are good looking, and all the children are above average.” The “Lake Wobegon Effect” comparison to teacher evaluation ratings highlights the growing concern that the majority of teachers in schools across the country receive satisfactory evaluation ratings. A similar idea is illustrated by Weisberg, et al. (2009) in their comparison of teacher evaluation to that of a factory creating “widgets,” or components that are seemingly interchangeable and versatile enough to serve multiple purposes. A culture of indifference is perceived as the majority of teachers receive top or close to the top ratings from their teacher evaluation, making effective teachers tough to identify or celebrate. In their study of 15,000 teachers across 12 districts and 4 states, Weisberg, et al. (2009) found that 99% of teachers were rated as
satisfactory, and in districts with more than two evaluation categories, 94% of teachers were rated in the top two categories. Less than 1% of teachers evaluated received the lowest rating of unsatisfactory, despite the fact that many of the participating schools failed to meet the Adequate Yearly Progress expectations of the federal No Child Left Behind Act. Toch and Rothman (2008) found similar results in their examination of teacher evaluation in public schools throughout the United States.

Teacher evaluation ratings such as these do not make much sense because research has shown that “excellent teaching is, by definition, rare. It is distinguished by judgement, intuition, insight, creativity, improvisations, and expressiveness” (Wise, et al., 1985, p. 108). By this account, we might expect the reverse to be true of the evaluation ratings, that very few teachers are rated in the highest category, with many in groupings working toward higher categories representative of professional advancement. The New Teacher Project (TNTP, 2010) interprets this failure to differentiate between levels of teacher competency as disrespectful toward the profession as a whole, stating, “If we want good teaching in every classroom, good teaching must be valued” (p. 2). That being said, a reality exists within the culture of teacher evaluation that associates negative implications with the idea of being classified below the top category. Tradition has set a standard of indifference that administrators must work against in order to change the culture and stigma associated with a sub-top category.

Weisberg, et al. (2009) identified 43% of teachers who viewed evaluation procedures as helpful for their professional development and growth, with 26% receiving information on areas of development that were identified. Seventy-four percent of teachers received no specific feedback, 57% of which were in their first four years of
teaching. Forty-seven percent of the participating teachers had not had a conversation over the past year about improving their instructional effectiveness. When examining teacher evaluation and feedback from the administrative point of view, no administrators were either “very satisfied” or “dissatisfied” with the evaluation process. Opinions ranged and were fairly evenly split between “satisfied” (36%), “somewhat satisfied” (36%), and “somewhat dissatisfied” (27%). On a related note, administrators described their capacity to evaluate teachers along a continuum as well. No administrators felt they had “very extensive” training, 25% described their training as “extensive” or “somewhat extensive,” 55% as “somewhat limited,” 9% as “very limited,” with 9% claiming “no training at all” (Weisberg, et al., 2009). With 73% of administrators claiming limited to no training in the process of evaluation, one may question whether that is a direct reflection on the 74% of teachers receiving no feedback in the study in question.

In the creation of an underused and unreliable culture of documenting teacher performance, the teacher evaluation process has become a system that is not trusted by teachers and has offered little in terms of feedback for improvement (Danielson & McGreal, 2000; Adams et al., 2015). Many researchers have mentioned deficiencies in the teacher evaluation system that might be responsible for these less than stellar reviews of the process. Evaluation has been deemed problematic on many levels: classroom observations rarely happen more than once per year and in many districts much less frequently (Danielson & McGreal, 2000; Marshall, 2005), evaluation results are inconsequential to both teachers and administrators which reduces motivation on both ends for improvement and growth (Donaldson, 2009), teachers are rarely provided with critical and meaningful feedback for improving (Donaldson, 2009; Marshall, 2005),
administrators are often strapped for time with additional responsibilities being added that fall outside of their roles as instructional leaders (Donaldson, 2009; Marshall, 2005; Milanowski & Heneman, 2001; Wise, et al., 1985), evaluation instruments are overwhelming and burdensome to employ (Danielson & McGreal, 2000; Darling-Hammond, 2013; Donaldson, 2009; Marshall, 2005) alongside administrators who have experienced inadequate training (Danielson & McGreal, 2000; Wise, et al., 1985), and are hesitant to be honest with negative evaluation ratings (Danielson & McGreal, 2000; Donaldson, 2009; Wise, et al., 1985). As Darling-Hammond (2013) observes in her book on *Getting Teacher Evaluation Right*, “It is easy for procedures to overwhelm purpose in almost any reform, and this is particularly true for evaluation” (p. 140). If administrators with little training are attempting to wade through time intensive evaluation instruments they don’t understand how to use, then it makes sense that many of them are marking “satisfactory” out of pure necessity and the burden of reality, with little feedback offered along the way.

Providing growth feedback is not a straight-forward process for administrators, and can become even more complicated depending on their experience and training (Marzano & Toth, 2013). Two of the most popular evaluation frameworks currently used include Charlotte Danielson’s Framework for Teaching Evaluation Instrument, comprised of 76 elements broken down into four major domains of teaching, while Marzano’s Art and Science of Teaching Framework also explores four domains of teaching, broken down into 60 elements of observable factors to evaluate in the classroom (Marzano, et al., 2011). Marzano and Toth (2013) describe these frameworks as both comprehensive in covering a range of instructional strategies, and specific in
recognizing particular classroom strategies and behavior. Garnett (2013) similarly posits that more comprehensive frameworks for evaluation lead to a greater likelihood of the professional growth of the teacher. Teacher perceptions concerning the use of these evaluation instruments have discussed administrator feedback in the form of checked boxes of strategies incorporated during the observation time, with no accompanying critical feedback or discussion. The provision of observation checklists in place of constructive feedback to teachers has not been shown to be informative or helpful to teachers, and, once again, provides no directions for growth (Marzano, et al., 2011; Stein & Nelson, 2003; Toch & Rothman, 2008; Van Soelen, 2013). In light of this dearth of feedback, Marzano and Toth (2013) found that “when observers are uncertain in their knowledge base, they tend to avoid giving feedback, or they rely on cut-and-paste responses. Principals have openly shared with us that they are hesitant to engage in dialogue about instruction with teachers who may know more than they do about the strategies” (p. 167). Weisberg, et al.’s (2009) work on the importance of differentiating between teachers shared various principal perspectives, including “I do not feel adequately trained to conduct a teacher evaluation. There are evaluation tools, but no one reviews them with you. We are not trained on the process. As a first year principal, you try it and you move through the process because it has to be done” (p. 21).

In an examination of the literature, it becomes clear that the shortcomings of teacher evaluation systems stem, not from an unappreciated type of provided feedback, but rather the absence of quality performance feedback as a directive toward professional growth (Blase & Blase, 2004; Darling-Hammond, 2013; Marshall, 2003; Milanowski & Heneman, 2001). Time, coupled with an ever-growing list of responsibilities for
administrators, has resulted in a lack of constructive feedback following a classroom observation that has become the norm rather than the exception. When quality feedback, a precursor for development and growth, is not offered, teachers can become frustrated and experience a loss of respect for their evaluators and the evaluation process in general. Furthermore, post-observation conferences that involve little to no feedback can negatively impact the teacher in a number of ways, such as diminished capacity and self-esteem, loss of motivation, lowered morale, increases in anger and futility, stagnation, potentially leading to the end of an individual’s teaching career (Blase & Blase, 2004; Feeney, 2007; Loeb, Darling-Hammond, & Luczack, 2005; Marshall, 2003). In their study of teachers in Cincinatti, Heneman and Milanowski (2003) found that over half of the teachers leaving either the district or profession cited teacher evaluation systems as an influencing factor. In interviewing teachers to gauge feedback perceptions, responses included comments like, “I want to do better but how can I do better?” (Meadows, 2015, p. 91). A teacher from Louisiana stated, “Evaluation was just something we had to do. The principal would stay for a dog and pony show lesson…We didn’t get feedback, and I didn’t grow” (Ritter & Barnett, 2016, p. 50). Yet another teacher from a feedback perception study conducted by Meadows (2015) shared, “since 5s were the top score, I was relieved; yet at the same time, disappointed. The scores were great, but I did not feel like a great teacher. I wanted comments about what I could do to improve my teaching” (p. 43). Feeney (2007) suggests, “an evaluation has no meaning if it is not interpreted, questioned, discussed, and reflected on, ultimately leading to making different and more effective decisions” (p. 195). In light of previously shared teacher perspectives, Feeney may be on the right track. In interviews of more than 50 participants, Ritter and Barnett
(2016) received responses indicating that teachers felt “the feedback resulting from observation postconferences may be the most important contribution of improved teacher evaluation systems, and teachers benefit from the opportunity to reflect” (p. 51).

**Content-Neutral Leadership**

Traditionally, instructional leadership has been viewed from a content-neutral standpoint, where the administrator takes on a generalist role as an expert evaluator. Administrators are seen as specialists in general pedagogy that don’t typically offer specific supports to the content being covered by specialist teachers. The previously mentioned evaluation frameworks of Danielson and Marzano were designed to offer generic supports for all instruction, regardless of the content area or grade level of the classroom, thus providing a content-neutral, versatile tool for administrators to use in evaluating teachers, regardless of their content expertise (Lowenhaupt, et al., 2017).

Much of the literature surrounding teacher evaluation and feedback practices is also focused on the process from a content-neutral point of view, with research on instructional leadership that is separated from both conversations of content as well as that of secondary education specializations (Lochmiller, 2015; Lochmiller & Acker-Hocevar, 2016; Lochmiller, Huggins, & Acker-Hocevar, 2012). Administrators as evaluators are expected to understand and assess generic best practices associated with quality teaching, regardless of the subject matter (Donaldson, 2009; Lochmiller, 2016; Roberge, 2014; Toch & Rothman, 2008; Wise, et al., 1985). As Wise, et al. (1985) state, “The use of generic teaching skills as the basis for evaluation implies that the evaluator need not know much about the subject matter and grade-level pedagogical demands.
Thus, a generalist principal can evaluate all teachers under his or her jurisdiction” (p. 107).

Research conducted by Donder (2011) and Torff and Sessions (2005; 2009) has shown that teachers tend to have a solid understanding of the content they are covering, but, at times, have been found lacking in the pedagogical expertise needed to reach all students. In a survey of secondary administrators examining whether greater deficiencies existed in teacher content or pedagogical knowledge, administrators did not rate content knowledge as a concerning variable for growth needs (Torff & Sessions, 2005). The most common areas of necessary growth cited were classroom management, lesson implementation, and rapport with students. Differences across the pedagogical components of the study were large; however, differences across content areas within a component were not, indicating that content deficiencies were not a concern. Furthermore, professional development efforts that were focused on content were found to be contrary to what the specialized teachers actually needed to grow professionally.

“Good instruction is good instruction.” Administrator perceptions of whether content-neutral frameworks are adequate for supporting teacher growth in the classroom often defend the reality of being an instructional leader who cannot be expected to be a content expert in every subject area supervised. Lochmiller (2016) found that administrators frequently drew from personal teaching experiences when offering feedback to teachers, and believed that good teaching practices in English classes were the same as those in math or science classrooms. Specifically, one participant shared, “I think good teaching is universal and it does not matter what subject area I supervise” (Lochmiller, 2016, p. 90). Meadows (2015) received the following interview response
from an administrator with 17 years of experience in leadership, with 16 years of
teaching expertise: “I may not know the subject, but I know what good teaching is and
what good strategies are and what best practices are. So, I can go to a Spanish class. I
don’t know a word they’re saying, but I know what I’m looking for” (p. 74).

Literature examining administrator competencies in content-specific leadership
found that instead of claiming expertise in areas outside of their knowledge base or
working to acquire the necessary knowledge to lead, many administrators look elsewhere
to support teachers. For example, Lochmiller and Acker-Hocevar (2016) found that
administrators weak in certain content areas look to hire new teachers as specialists, rely
on professional development opportunities to support content experts, or search for
resources or consultants to utilize. Administrators unfamiliar with the content knowledge
in question tended to take a step backwards in their leadership involvement, and relied on
department chair specialists to take the lead in providing collaboration or other supports
as experts in the area. Some sources question whether outside experts should provide
content-specific feedback to specialist teachers as existing mainstream evaluation
frameworks (i.e., Danielson and Marzano) do not provide content-specific supports for
non-expert instructional leaders to utilize (Cohen & Goldhaber, 2016; Lowenhaupt, et al.,
2017).

**Content-Specific Leadership**

Current evaluation instrumentation consists of generalized, content-neutral
checklists of “look fors,” such as establishing classroom routines, engaging students, and
building relationships with students, to name a few (Danielson & McGreal, 2000;
Marzano, et al., 2011). Donalson (2009) describes these evaluative checklists as entities
that have oversimplified the teaching process, that have included items not essential to
instruction, like bulletin board design, for example. Because of generic evaluation
frameworks in place and traditionally content-neutral styles of leadership, the concept of
what instructional leadership would look like with a content area consideration is not one
that has been explored in detail. Much of the research conducted at the elementary level
shows that instructional leadership appears differently in every subject matter (Burch &
Spillane, 2003; Spillane, 2005). Some of these differences incorporate various levels of
administrator involvement, depending on the subject matter at hand. Secondary leaders
are further challenged with the degree of specialization that occurs in high school content
areas (Grossman & Stodolsky, 1994; Lochmiller, 2016). Not only are content areas
departmentalized in a secondary setting, but there are further specializations of teachers
as they focus on particular subject matter within each content area. For example, a high
school science department is made up of all science teachers in the building, and then
within that science department, teachers will have more focused specialties in biology,
physics, or chemistry, and even various levels of classes, from general versions of a
course, to honors, and even Advanced Placement college-level classes in some instances.
Furthermore, within biology, teachers can specialize in Environmental Science, Anatomy
and Physiology, Forensic Science, and Zoology, to name a few.

Secondary administrators, regardless of their training and credentials, are
challenged to provide quality feedback to specialist teachers using content-neutral
checkpoints designed to transcend not only the science department, but also math,
English, social studies, foreign language, business, art, physical education, family and
consumer science, performance arts, and industrial technology. While it has been shown
that teaching practices depend on a myriad of factors, such as student grade level, the school’s mission and culture, as well as contexts involving location, district, state, and national pressures, subject matter is also a dominant consideration (Grossman & Stodolsky, 1994). While this is not a new struggle for high school administrators, little research has been focused on instructional leadership practices within various content areas (Lochmiller, 2016). To complicate matters further, not much is known about how administrators who are not content experts can provide specific feedback to specialist teachers, or what that feedback even needs to look like to encourage the professional growth of teachers (Khachatryan, 2015). That being said, Toch and Rothman (2008) found that evaluation quality increased when administrators with content expertise were responsible for offering feedback to content experts. As acknowledged by an executive director of secondary education in Colorado, “Good instruction doesn’t look the same in chemistry as in elementary reading” (Toch & Rothman, 2008, p. 7).

Critics of teacher evaluation have pinpointed many faults within the process, but one highlights the lack of content knowledge of the secondary administrator (Torff & Sessions, 2009). Lochmiller (2015) posits that “principals are being prepared with generic instructional leadership skills and are not receiving significant exposure to research or best practices directly tied to specific content areas” (p. 48). Many have acknowledged that it is an impossibility for secondary administrators to be experts in every content area, and as such, feedback offered during a teacher evaluation tends to focus more closely on general pedagogy than content knowledge (Khachatryan, 2015; Stein & Nelson, 2003; Torff & Sessions, 2009). Lowenhaupt, et al. (2017) found that although most administrators were utilizing a content-neutral approach to instructional
leadership, they acknowledged the limitation of being unable to offer content-specific supports. “Although they attended to such crucial features of instruction as student engagement and differentiation, we would argue that to support the implementation of deep subject-specific reforms, this content-neutral approach is not sufficient” (Lowenhaupt, et al., 2017, p. 26). Similarly, Stein and Nelson (2003) showed in their study of Leadership Content Knowledge, that the practice of generalizing between subject areas is not an appropriate act of instructional leadership, and that content areas are not interchangeable at either the primary (Spillane, 2005) or secondary (Grossman & Stodolsky, 1994; 1995) levels of education.

Often times teaching is discussed either in terms of pedagogy or content knowledge, although neither is sufficient on its own. Teachers need to have both a thorough knowledge of their content area, and an understanding of how to connect that content to students in a meaningful way, clear up present misconceptions, and predict which topics will be easy or difficult for students to grasp (Ball et al., 2008; Danielson & McGreal, 2000; Rhoton, 2001; Shulman, 1986). Shulman (1986) described this ability as pedagogical content knowledge (PCK) in which the connection between content knowledge and pedagogical strategies becomes established. In his purposeful connection of these two entities, Shulman (1986) states that “mere content knowledge is likely to be as useless pedagogically as content-free skill. But to blend properly the two aspects of a teacher’s capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching process” (p. 8). Stein and Nelson (2003) take this idea one step further to apply leadership actions to PCK in their discussion of the knowledge administrators use to operate as instructional leaders.
Leadership content knowledge (LCK) was coined and deemed a “missing paradigm” in the realm of instructional leadership. Understanding content in terms of how students learn, where a teacher might observe misconceptions, and how teachers learn make up the components of LCK. This intentional connection between leadership actions and content areas has been demonstrated in the literature (Burch & Spillane, 2003; Grossman & Stodolsky, 1994; 1995; Spillane, 2005). With leadership actions and content intertwined, the provision of purposeful, quality feedback by an administrator to a specialist teacher within the context of their content would help to elicit professional growth and change in instructional practices (Lochmiller, 2016; Stein & Nelson, 2003).

Figure 1. Nested learning communities (Adapted from Stein & Nelson, 2003, p. 425).
Stein and Nelson (2003) diagram their concepts of LCK and how it relates to PCK, leadership, content, and learning in general. Figure 1, revisited from Chapter 1, illustrates the concept of nested learning communities in which there exists a multi-layered approach to working and learning together in an educational system. In Circle 1, the content, or the subject matter, exists as the center of the nested community, with every other interaction of teaching and learning surrounding and including that entity. In Circle 2, teachers are working with students, the learners of the subject matter at hand. This involves PCK and the idea that the teachers must know more than just the content area, by being able to challenge students through common struggles and challenges within each concept, common misconceptions, and the best practices for teaching the content. Circle 3 shows the principals as the teachers of the teacher learners and is the focal point for this study. This circle encompasses the ideas behind LCK, in that it includes everything within the smaller circles, namely the subject matter, how to teach the content, how students learn the content, as well as how teachers learn new concepts, and effective ways of teaching teachers. These are concepts of how administrators as instructional leaders can best help teachers improve their abilities to reach students in their specialized secondary classrooms, through the process of offering quality feedback within a teacher evaluation system. In the final circle (4), which is outside of the range of this study, district leaders are shown teaching and leading the adult professionals as principals, central office administrators, and staff in general.

Worthy of notice in examining Figure 1 is the idea that the role principals play as teachers in Circle 3 is not one of transmitting knowledge, but rather of demonstrating an adequate understanding of both teacher and student learning needs, creating an
atmosphere of excitement and motivation for learning, and providing resources necessary for support. Another point of importance is that the subject matter is always at the heart of the teaching and learning community. As Stein and Nelson (2003) explain, “Notice as we move away from the classroom, knowledge about subject matter does not disappear, and what administrators need to know does not become more generic. The needed knowledge remains anchored in knowledge of the subject and how students learn it” (p. 442). This is a key component of the nested learning community that strays from traditional views of administrators as content-neutral generalists in their work as instructional leaders. “Without knowledge that connects subject matter, learning, and teaching to acts of leadership, leadership floats disconnected from the very process it is designed to govern” (Stein & Nelson, 2003, p. 446). The PCK and LCK within the nested learning community is specific to the identified subject matter that exists as the anchor of the community. One potential complication of LCK occurs when administrators take PCK from a content area of greater familiarity and attempt to apply it to another. It might be that the pedagogy does not translate from one content arena to another.

Teachers, especially those at the secondary level, have been found to professionally identify with the content area they teach. Content influences instructional perceptions and practices, social connections, and the ways that teachers think about curriculum, learning, and teaching (Burch & Spillane, 2003; Grossman & Stodolsky, 1994; Stodolsky & Grossman, 1995). Methods courses in teacher preparation programs focus on subject matter, as do professional teacher organizations, and specialized high school departments are organized by content covered. In a sense, the content area creates the context within which the teachers of a particular subject matter can be understood and
pushed to grow. If “so much of teaching is inherently domain-specific,” as suggested by Davis, Petish, and Smitey (2006, p. 608), instructional leadership practices that hold content in high regard can work to differentiate between content areas and teaching practices (Theoharis & Brooks, 2012).

Teacher connections to their content area have been found to influence the way in which feedback and school-wide reform information is received. Feeney (2007) suggests that meaningful feedback needs to be connected to a teacher’s content area because teachers are depending on this feedback to make decisions on how they will teach specifics within their content. Administrator feedback lacking content-based information has been perceived by teachers as “shallow and meaningless comments devoid of any connection to student learning” (p. 193). If teacher mindset and understanding is influenced by their content area (Grossman & Stodolsky, 1995), teacher reception of feedback is dependent upon the focus of said feedback (Lochmiller, 2016; Lochmiller & Acker-Hocevar, 2016). On a related note, reform efforts through professional development can also be affected by the content focus of the efforts. Secondary content experts have been shown to respond differently to reform initiatives than their colleagues, depending on the subject matter (Spillane, 2005). For this reason, administrators and professional development designers must be aware of content area “subcultures” that exist in order to address questions that might come up along the way (Grossman & Stodolsky, 1995). “Generic treatments of reform efforts at the secondary levels may allow teachers to disengage, if they believe that their subject matter is somehow exempt” (Grossman & Stodolsky, 1995, p. 10). If teachers view their professional world through
their content area focus, it could be that some feedback or reform efforts don’t make sense when seen from various viewpoints.

Research has shown that teaching strategies deemed “highly effective” were dependent upon the subject matter, grade level, types of students, and instructional goals (Wise, et al., 1985). For example, different strategies might be more successful in a 9th grade classroom than a class full of seniors. Various techniques might make a difference in connecting content to students in a Spanish classroom versus a biology classroom, and likewise for the way a teacher would instruct a general, honors, or Advanced Placement course in a high school setting. If evaluation instruments used to judge teacher competency in utilizing such strategies are not adjusted for each content area accordingly, they cannot be expected to account for all of these differences.

Knowledge of content, of content-related pedagogy, and the approaches to learning displayed by students at different developmental levels, are highly relevant to teaching. Teachers may well be more knowledgeable in these matters than the administrator who evaluates their performance; this fact undermines the evaluation process, contributing to the perception that it has little value.

(Danielson & McGreal, 2000, p. 6)

Danielson and McGreal (2000) go on to say, “Many administrators, especially those whose background is in the humanities, would be hard-pressed to spot content inaccuracies in a chemistry class” (p. 6). If Torff and Sessions (2009) are correct in the idea that teachers are solid in content knowledge but lacking in pedagogical skills, this statement is not concerning. However, if the administrators in their study are acting on an
assumption that teacher content knowledge is solid because they are unsure about the content in question, this statement becomes troubling.

I tend to think of this idea of taking expected experts at their word in terms of a mechanic analogy. When I take my car into the mechanic, I am very much outside of my comfort zone, unable to “talk the talk.” If something is wrong with my car, I attempt to describe the problem to the mechanic with what I know to be an embarrassing array of misused vocabulary and failures to adequately communicate what seems to be the issue. I am thankful when the expert mechanic is able to take my jumble of words, make sense of them, and then pinpoint and fix the problem. A similar interaction occurs whenever I take my car in for a basic oil change or maintenance check. I attempt to make sense of the mechanic’s message if the individual is unwitting enough to call and alert me of a problem with my car that I did not expect when taking it in. I typically ask several questions for clarification, but in the end am trusting that my mechanic is the expert in automobile maintenance that I will never be. In using this analogy, I am able to see similarities with both the process of teacher evaluation and the provision of quality feedback to specialist teachers. For example, a non-content expert administrator might be able to pinpoint a problem in the instructional effectiveness of a specialist teacher, but might not have the ability to either communicate that problem in fluent content vocabulary or suggest a way to fix said problem that makes sense when content is taken into account. Administrators are counting on the content expert teacher to make sense of their words and figure out how to fix the problem, regardless of their ability to communicate effectively within the content context. Similarly, during a post-observation feedback conference, a non-content expert might ask several questions in an attempt to
understand why certain teaching techniques were used, but in the end they are putting their trust in the teacher to be the content expert that they are not.

In their study of effective teacher evaluation techniques, Wise, et al. (1985) discuss the struggles of a generalist evaluator in a specialist content area by stating,

Teaching competence may be conceived as a continuum. The further one moves along the continuum from minimal competence to excellence, the more wide-ranging and inferential the sources of data and the less uniform and generalizable the specific indicators…The demands of evaluation differ along this continuum. The evaluator needs no special expertise to recognize that a classroom is out of control…However, to evaluate the appropriateness of teaching decisions, the evaluator must know the subject matter, the pedagogy, and the classroom characteristics of the teacher being evaluated. The evaluator’s level of expertise must at least equal, if not exceed, that of the teacher being evaluated. (p. 93)

The authors posit that without evaluator expertise in the subject areas and grade levels under their supervision, moving beyond the “Lake Wobegon” and “Widget” effects in which every teacher receives a satisfactory rating will be a challenge. Progressing past basic classroom management suggestions is difficult with current evaluation resources available to administrators. Stein and Nelson (2003) pose the question of how to separate content-specific leadership knowledge from that which is still appropriate at the content-neutral level. Do available teacher evaluation instruments and resources available to administrators provide the supports necessary in this arena?

Teacher responses to the feedback process show that teachers have a preference for “quality over quantity,” in that the “quality” of the feedback discussion about their
classroom observation is more important than the “quantity” of the measured evaluation framework score (Meadows, 2015, p. 120). Teachers also showed preference for specific feedback about their lessons and content, rather than a generalized blanket statement that does not differentiate between their performance and that of their colleagues. In his dissertation study exploring teacher perceptions of administrator feedback, Roberge (2014) found that 33% (5/15) of teachers harbored negative feelings about the lack of content expertise in their administrator evaluator. Administrator feedback received by teacher participants in both California (Adams, et al., 2015) and Vermont (Roberge, 2014) focused on classroom management aspects, with no specific feedback connection to content teaching. One teacher shared, “Principals don’t truly understand what teachers do today, and then they give feedback and evaluate teachers on job performance? This doesn’t make sense; especially when suggestions by an administrator are without background in different grade levels and subjects” (Roberge, 2014, p. 94). In one example, Roberge found that a non-content expert had offered a content specialist teacher advice on how to teach content that the teacher didn’t feel was appropriate or possible. “How can I take their advice when they didn’t teach in my area? They have no idea what I do” (p. 94). Similarly, it was common for world language teachers to feel dissatisfied with the evaluation process, commenting, “My principal has no clue what I do in my classroom, nor what my students should be learning” (McAlpine, 2012, p. 186). Administrator perspectives have been examined in the research concerning competency with providing content-specific feedback to specialist teachers. One principal shared,

I feel pretty confident about going in and looking at solid instructional practices, in general, that are relevant and applicable to—across content areas. When it
comes to content-specific kinds of things, I am not as confident about specific strategic moves that teachers can make to support specifically that content, nor am I adept at helping teachers zero in on what’s most important here. (Lowenhaupt, et al., 2017, p. 19)

In a study of teacher perceptions and desires, Lochmiller (2016) found that teachers preferred administrators who demonstrated a basic competency in specialized content knowledge to allow for purposeful feedback related to content struggles. Interestingly enough, when teachers were asked to describe helpful feedback they had received from past evaluators, most teachers referred to content-neutral feedback. Expert administrators who were able to provide content-specific feedback were often viewed as forcing their style of teaching onto the content experts they evaluated. Although the administrators were experts in the content area, teachers did not seek out these administrators for feedback on a problem experienced in the classroom, but rather turned to colleagues within their departments or other similar contacts. It is not clear in the literature whether this response to avoid asking for help from administration is because of the accountability measure of teacher evaluation or some other factor. Teachers have been found to avoid asking their evaluators questions in an attempt to escape appearing weak in their content knowledge.

On a similar note, evaluators were found to be more critical of a lesson they had experienced teaching, than one with which they had no experience (Jacobs, Martin, & Otieno, 2008). Prior experiences allowed evaluators to draw from techniques already proven successful, or compare to another lesson they had already seen. Rhoton (2001) found that administrators with content expertise were effective at improving both
teaching and learning at the classroom level. Administrators with pedagogical content knowledge offered content-specific feedback to teachers that was deemed useful and carried more clout than suggestions from a non-content expert (Meadows, 2015). In a study examining teacher perceptions of administrator feedback, Khachatryan (2015) described an example of one administrator, a former history teacher, in detail. History teachers evaluated by this content-expert administrator received feedback on curriculum planning, were able to identify more areas to work on, and received feedback specific to their history content. Teachers of other content areas received feedback from the same administrator that was focused on classroom management, saw fewer areas suggested for improvement, with comments unrelated to their content area. From these initial observations, Khachatryan (2015) posited that “content knowledge may be necessary for providing effective feedback and pushing teachers to improve practice within their content domains” (p. 183).

While multiple sources recognize that administrators cannot be expected to be experts in every content area (Stein & Nelson, 2003; Theoharis & Brooks, 2012), there is more pressure being put on administrators to have sufficient knowledge to offer feedback in every content area they supervise. As it stands, instructional leaders are having to delegate feedback responsibilities to department leaders and other content experts, thus removing them from taking an active role in school improvement (Theoharis & Brooks, 2012). Administrators, as former teachers, most likely have solid pedagogical content knowledge in at least one subject, and Stein and Nelson (2003) call for “postholing” in other content areas to develop expertise. This might look like attending professional development workshops alongside content teachers in order to gain a new perspective in
understanding the content, experiencing the struggles of a learner of the content, identifying best practices to teach the content, as well as knowing what to look for during a classroom observation of a teacher in said content area. Nelson and Sassi (2000) conducted a study examining administrator feedback comments after watching video in a specialized mathematics setting both before and after receiving professional development with a focus on math supervision. Findings showed completely different feedback following administrator trainings, with initial viewings resulting in feedback on the teacher’s actions and classroom management components, while subsequent viewings resulted in focused feedback on the math learning, explorations, and conversations that were happening in the classroom. Interestingly enough, many feedback comments mentioning actions focused on pedagogy were not even brought up in the post-professional development feedback conversations. Administrator views of the quality of teaching happening in the video changed drastically after professional development training, sometimes from one of scattered or unfocused teaching to that of a strong teacher working with math learners in a purposeful way. The results of this study made it clear that basic understandings of learning in classrooms of specialized content are greatly impacted by gaining experience in the learning of the content itself.

In their book, *What Every Principal Needs to Know to Create Equitable and Excellent Schools*, Theoharis and Brooks (2012) offer leadership advice to administrators that differs based on content area examined. In areas of literacy, for example, the authors encourage the use of a checklist to help with observations as most successful administrators have ample experience with literacy-related instructional strategies from their days in the classroom. In terms of generalizability, literacy measures can be
observed regardless of content area as the skill sets involved transcend grade level and subject matter. Instructional leaders in a mathematics classroom are encouraged to take notes on what the teacher does to develop competent students, while being aware of current concepts and initiatives for supporting students. World language evaluations should be carried out using basic foreign language standards as well as those modified from the National Board for Professional Teaching Standards to help teachers grow. Finally, and most important to this study, science instructional leaders are encouraged to participate in professional development opportunities alongside science teachers to improve their understanding of effective science instruction, while developing observation instrumentation that is sensitive to the way science should be taught as well as the differences between various science disciplines (Theoharis & Brooks, 2012).

Along this same line of content-based leadership, Stodolsky and Grossman (1995) discussed five features of subject matter for administrators to be aware of because of the effect these features had on the way content teachers viewed their professions: the degree of definition, the scope of the content area, the degree of sequence, whether the content is considered static or dynamic, and whether the course is required or an elective. The degree of definition, or the agreement on the content covered, identified well-defined content within math and language, but less definition in social studies, English, and science. The scope of a content area considers the number of fields within the content matter. For example, math has a narrow focus, but social studies and science are considered broad. Broad scopes are related to teacher specialization because broader content areas typically see less rotation between courses taught. To use a personal example, as a former biology teacher, I specialized within the science department and
spent 10 years teaching Advanced Placement Biology, Honors Anatomy and Physiology, and Environmental Science, with few changes in the courses I was responsible for from year to year. Math and language content areas are considered both sequential, where content builds upon prior learning, and static, or unchanging. Social studies, science, and English are non-sequential, with content not dependent upon past learnings, and dynamic in their continual changing. Required courses, such as the core content areas of English, social studies, math, and science are typically connected to higher accountability measures through testing and curriculum standards, while also receiving claims of higher status and supplied with more resources. Regardless of these five subject matter features, groups of teachers of related content were found to express more agreement in what strategies they used to teach their subjects than what to teach (Stodolsky & Grossman, 1995).

To further attest for differences between content areas, accountability measures were heightened in content areas that were associated with state and national testing (Lowenhaupt, et al., 2017). Ninety-six percent of administrators interviewed described accountability focused on math and literacy because of testing initiatives. In the Massachusetts study of elementary, middle, and K-8 schools, 62% of administrators claimed they rarely supervised science content, and when they did, offered only content-neutral feedback with no content-specific supports. Burch and Spillane (2003) found similar results, with 80% of elementary leadership focused on literacy and math, and only 13% looking at improvements in science. In yet another elementary setting, Spillane (2005) found this focus and comfort level mirrored in teachers, with colleagues interested in collaborating about literacy, but hesitant to offer advice in either math and science.
Literacy conversations branched out beyond basic discussions of classroom materials and lesson plans to examine teaching strategies, as well as both student and teacher learning. Building experts in literacy were abundant in nature while math experts were sought out from the external community.

In terms of instructional leadership involvement, 87% of principals and 67% of curriculum coordinators were involved with literacy instruction, with 57% of leaders involved in daily reform efforts and comfortable offering large amounts of feedback (Burch & Spillane, 2003). When compared to math reform efforts, only 37% of principals were involved, with 60% of curriculum coordinators, and 14% of assistant principals. Leaders were less involved with daily reform efforts in math classrooms and did not offer much in terms of feedback. Science instructional leadership, in general, was a rare occurrence at the elementary level because testing tends to focus around the subjects of literacy and math (Lowenhaupt, et al., 2017; Spillane, 2005). Literacy leaders outnumbered math leadership 3:1 at the elementary level, with an even more skewed ratio with that of science leadership. Similarly, while literacy usually involved high levels of involvement from administrators, math leadership utilized lead teachers or department heads, and science leadership incorporated the use of classroom teachers (Spillane, 2005).

Science Reform and Related Leadership

Focused instructional leadership becomes paramount in times of reform, as predicted in light of science changes to be implemented throughout the K-12 educational system, namely through Next Generation Science Standard (NGSS) initiatives and Nebraska’s College and Career Ready Standards for Science (Lowenhaupt, et al., 2017). Through these reform efforts, stakeholders have demanded major changes in the way
students learn science, with a hope for the enhancement of our nation’s workforce and upcoming innovators, the development of 21st Century Skills in our students, and the creation of an awareness of Science, Technology, Engineering, and Mathematics (STEM) fields as they assimilate in our daily environment (Sandall, 2016; Southerland & Sampson, 2012). These demands are a result of rapidly changing technological and economic needs, and the decline of both student performance and interest in STEM fields throughout their K-12 experiences as is reflected in post-secondary choices of majors and graduation rates (Pittinsky & Diamante, 2015; Sandall, 2016). Although science reforms are already underway in many states, there is a dearth in the literature, especially at the secondary level, about how administrators as instructional leaders can best support science teachers and instruction throughout reform efforts (Lochmiller, 2015; Lochmiller & Acker-Hocevar, 2016; Lochmiller, Huggins, & Acker-Hocevar, 2012; Theoharis & Brooks, 2012).

NGSS initiatives ask science teachers to prepare students for the solution of authentic problems connected to multiple disciplines (Ruggirello & Balcerzack, 2013). The NGSS approach to teaching science involves more hands-on, inquiry-based approaches to science and less teacher-oriented actions, such as lectures, textbook reading, and rote memorization (Rasmussen, 2017; Rhoton, 2001; Southerland & Sampson, 2012). This shift from traditional science pedagogy will require more teacher capacity with content knowledge (Fricke, et al., 2008) alongside supports from administrators and science-specific professional development opportunities (Hutner & Sampson, 2015). Science teachers will need administrators competent in PCK and LCK to help guide them through changes in instructional practices.
Research in the literature has identified a deficiency in administrator expertise in science content areas. In their study of School Leadership for Science Education, Halverson, Feinstein, and Meshoulam (2011), citing the Wisconsin Department of Public Instruction (2006), found that only 5.5% of Wisconsin administrators had their degrees or credentials in the sciences, while Lowenhaupt, et al. (2017) identified 11.5% (3/26) of Massachusetts administrators that specialized in science fields. Of 115 principals in the New York area, Khan (2012) found that 15% of elementary school administrators identified as core subject teachers, while only 1.7% (2/115) were former science teachers. Khan (2012) took this information one step further to measure the science content knowledge of all 115 participating administrators using MOSART and BARSTL inventory scores. The elementary principals, 77% of which had formerly taught K-6 grades, scored a mean score of 64.74% on the test meant to cover K-4 Physical Science content. Out of the 115 administrators, 6% (7) earned an A for excellent understanding, 13% (15) earned a B, 24% (28) earned a C, 17% (19) earned a D, and 40% (46) of administrators surveyed earned a failing final grade on the science content survey.

In their study of the need for K-8 science supervision, 65% of administrators interviewed by Lowenhaupt, et al. (2017) discussed their own shortcomings as they related to relevant experiences, knowledge, or capacity to supervise science, and identified a district shortcoming in the amount of administrator professional development that is offered to support instructional leadership in this venue. In his interviews of 126 administrators throughout Washington state, Lochmiller (2015) found that 16.7% (21) had undergraduate degrees in STEM fields, with 6% specializing in biology, 2% in chemistry, 5% in math, and 1% in engineering. Fifty-five percent of these administrators
felt prepared to lead instruction in science, compared to 57% in math, 70% in English, and 71% in social studies. Only 29% of interviewed principals felt prepared to lead in STEM instruction, citing the engineering and technology pieces as the reason for the lowered self-efficacy.

Administrator responses to interview questions concerning science supervision in the Lowenhaupt, et al. (2017) study included comments like,

I can look at instructional practices in science, but it’s hard for me to evaluate was this a really good lesson? Is this what’s important to be teaching kids? I can look at kind of the pedagogy; I can look at the components of a good lesson, but the background knowledge that is important to have, I don’t have. (p. 19)

Lochmiller and Acker-Hocevar (2016) found that principals perceived their dearth of math and science understanding as keeping them from being able to offer direct feedback to improve instruction. Administrators were unable to offer suggestions because they could not “talk the talk.” One principal shared, “We have really hit a wall in math and even more so in science because I don’t feel like those are content areas where I am as equipped to change instruction. I don’t feel like I know enough about the content to provide much feedback” (p. 283).

Teachers interviewed in both math and science contents, shared a desire for content-specific feedback from administrator evaluators that they weren’t convinced could be offered (Lochmiller, 2016; Meadows, 2015). Feedback offered was described as content-neutral in nature, and focused mainly on basic teaching strategies and classroom management. Teacher perspectives included comments like, “I think administrators are somehow okay with the way math and science teachers teach because they may or may
not know the content that well” (Lochmiller, et al., 2012, p. 214). Another teacher from a
different study commented,

You have a person with a good knowledge of students and an idea of what an
effective classroom looks like, and very little science content expertise visiting a
class. I think, therefore, there’s probably pretty low pressure on the teacher to do
better, because in general that supervisor knows way less about what’s going on
in there than the teacher does. (Lowenhaupt, et al., 2017, p. 20)

Finally, a math specialist from another study shared,

I’m not saying anything negative against, about my administrators because
they’re great at what they do. But a math person was able to give me some very
specific feedback that would help me to become a better math teacher. That, my
administrators just don’t have the math expertise to do. (Meadows, 2015, p. 93)

In light of the fundamental role instructional leaders play in reform efforts, some
administrators worry that their lack of expertise is limiting the amount of instructional
supports they can offer to teachers in the science arena (Halverson, et al., 2011;
Lowenhaupt, et al., 2017). Science content possesses a unique system of organization and
vocabulary comparable to no other subject matter (Wallace & Louden, 2003), and
therefore, instruction looks much different from that of other content areas (Hutner &
Sampson, 2015; Southerland & Sampson, 2012). As most teacher evaluation “look-fors”
are content-neutral in nature, administrators struggle to differentiate between content
areas and are largely unable to identify quality science teaching in the classroom setting
(Hutner & Sampson, 2015). To account for these shortcomings, various studies have
identified ways in which administrators have built up their knowledge in specific content
areas by becoming active learners of the subject matter. Stein and Nelson (2003) show an example of an administrator who was able to build her math knowledge as a learner of the subject, enabling her to understand the logic of the lesson, the student reasoning behind various ways of thinking, and whether the selected pedagogy was appropriate. This new-found knowledge helped the principal connect the content to the strategy and provide quality feedback for the specialist teachers following classroom observations. Carver, Steele, and Herbel-Eisenmann (2010) conducted a similar study of a principal that, once again, became the math student by solving and discussing algebra work, watching videos of teacher implementation of various concepts, analyzing student work, and experiencing new terminology, techniques, and practices as a struggling student. These experiences led to a discovery of the key practices to “look for” during a classroom observation, including what the teacher and the students should be doing, how to listen for student thinking, how teachers can influence said thinking, and what types of feedback can lead to the professional growth of math teachers. Harmon, Gordanier, Henry, and George (2007), conducted yet another study utilizing the Ozark Rural Systemic Initiative (ORSI) which works to track professional development efforts by teachers, as well as train administrators to conduct meaningful classroom observations of teachers. ORSI has also operated under the guise of providing continuous and content-specific professional development to teachers, with follow-up assistance to schools, while incorporating assistance for the leadership of teachers and opportunities for external evaluation. A key response to this initiative is that, for the first time, teachers are reporting purposeful walk-throughs, with administrators offering feedback specific to their content areas of math or science instead of content-neutral pedagogy.
While there are plenty of studies that call for content-specific feedback from administrators with more capacity and training, there are also studies that show that content-specific feedback and efforts by administrators to focus on content are not always appreciated or accepted by content specialist teachers. Lochmiller (2016) conducted interviews of teachers concerning administrative feedback in math and science content areas, discovering that administrators with math or science expertise offered feedback to content experts that was only slightly different from their non-content expert counterparts. The main difference with advice from a content expert administrator was that the feedback offered was viewed as more credible, especially when paired alongside the ability to discuss the subject matter with more specifics and in deeper undertones. In general, however, administrators were not perceived by teachers as having the capacity to provide content-specific supports in math and science, and specialist teachers were more likely to visit with similarly specialized teachers for ideas or suggestions (Lochmiller, 2016). Lochmiller (2016) also found that, “…while teachers may want specific feedback that aligns with their content area, they may not be completely dissatisfied when the feedback provided to them is more specifically focused on their pedagogical practices than their content area” (p. 93). As Garnett (2013) states in her study on teacher effectiveness, experience, and evaluation ratings, “while there seems to be consensus in the literature that teacher effectiveness is the most important factor in the classroom that impacts student achievement, there is little consensus on how to effectively impact teacher effectiveness through teacher evaluation” (p. 2). Similarly, Coleman (1992) found that 58% of teachers interviewed believe the evaluation process makes them better teachers. This leaves 42% that do not feel the same way. The teachers who felt supported
cited helpful feedback in identifying strengths and weaknesses, and the offering of feedback on teaching in general. Is this all it takes to support classroom teachers or is there a way administrators can offer feedback to teachers of specialist content areas that will help them grow in a more continuous and sustainable way?
Chapter 3: Methods

This study focused on performance feedback and administrator capacity for providing feedback in a specialized setting. An exploratory approach was utilized for data collection using a concurrent, convergent mixed methods design (Creswell, 2012) in which both qualitative and quantitative data were given equal consideration. By definition, a mixed methods design involves the collection, analysis, and combination of both qualitative and quantitative data types (Creswell & Plano Clark, 2011). The idea behind a mixed methods design is that by utilizing both qualitative and quantitative data collection and analysis a researcher is able to gain a deeper understanding of an issue than by the examination of either data type alone. A mixed methods approach to research consists of combining and connecting the two types of data rather than just collecting, analyzing, and discussing the findings separately. This procedure allows for greater sample sizes while gathering a more complete view of participant perspectives, thus strengthening the weaknesses of using either qualitative or quantitative data on their own (Creswell, 2012; 2014). For example, quantitative data can be gathered from large numbers of participants and summarized in a general manner for discussion, while qualitative data provides more detailed, individualized responses that can tell a richer story (Creswell, 2012; 2014). When combined into a mixed methods design, the researcher accounts for the limitations of a qualitative study’s limited sample size, as well as that of a quantitative study’s lack of detailed responses. Specific to this study, quantitative data collection identified general perception trends established in samples of both secondary science teachers and administrator participants. Qualitative data collection strengthened identified quantitative generalities with detailed answers and
descriptions that might expand on specifics within the trends. Qualitative responses were also used for the potential of uncovering differences in perceptions due to evaluation instruments used or school districts explored. With only quantitative data, these differences, if they existed, might be recognized but not explained or understood.

A convergent approach of examining mixed methods data analyzes both quantitative and qualitative data separately and then compares the results to see whether the data “converge” on themselves and reach a similar consensus, or “diverge” into different perspectives (Creswell, 2014, p. 231). Qualitative data can expand on and provide more details to an emerging theme from quantitative data analysis, or highlight discrepancies that might exist. Agreement between qualitative and quantitative data supports and can strengthen the overall study results, while discrepancies between the two types of data may identify a focus for further investigation, both of which are purposeful results of exploratory research.

With a concurrent approach to research design, both qualitative and quantitative survey data were collected at the same time from secondary science teachers and administrators, respectively. A separate instrument was used to gather perception data from each of the aforementioned participant groups. Information gathered from secondary science teachers was used to examine perceptions of feedback practices, administrator competency in the provision of feedback, experiences with content-neutral and/or content-specific feedback, and science teacher needs when it comes to the teacher evaluation and feedback process. Data assembled from administrators with or without science expertise explored perceptions of self-efficacy in providing feedback in a secondary science classroom. The dearth in the literature about teacher and administrator
perceptions as they pertain to content-related performance feedback guided this study and helped determine the research design. A detailed visual model of the design for this study is outlined in Table 1, as recommended by Morse (1991).

Table 1.

*Procedures for concurrent convergent mixed methods study design*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Procedure</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science Teachers</td>
<td>Administrators</td>
</tr>
<tr>
<td></td>
<td>• TEES-F survey (goal of n=15)</td>
<td>• ASES-S survey (goal of n=15)</td>
</tr>
<tr>
<td></td>
<td>• Data screening of Likert scales</td>
<td>• Data screening of Likert scales</td>
</tr>
<tr>
<td>Quantitative Data Collection and Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science Teachers</td>
<td>Administrators</td>
</tr>
<tr>
<td></td>
<td>• TEES-F survey (goal of n=15)</td>
<td>• ASES-S survey (goal of n=15)</td>
</tr>
<tr>
<td></td>
<td>• Data screening of Open-ended questions</td>
<td>• Data screening of Open-ended questions</td>
</tr>
<tr>
<td></td>
<td>• Thematic coding</td>
<td>• Thematic coding</td>
</tr>
<tr>
<td></td>
<td>• Analysis of common themes</td>
<td>• Analysis of common themes</td>
</tr>
<tr>
<td>Qualitative Data Collection and Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science Teachers</td>
<td>Administrators</td>
</tr>
<tr>
<td>Connective Quantitative and Qualitative Phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Analyze degree of convergence of both data types</td>
<td>• Examination of Science Teachers qualitative vs. quantitative</td>
</tr>
<tr>
<td></td>
<td>• Analysis of common trends and themes for content-neutral and content-specific feedback</td>
<td>• Examination of Administrators qualitative vs. quantitative</td>
</tr>
<tr>
<td></td>
<td>• Make comparisons between science teachers and administrators</td>
<td>• Examination of Science Teachers vs. Administrators</td>
</tr>
</tbody>
</table>
Participants

Districts and Schools

Four school districts were selected for this study based on several basic commonalities, namely that they are all public school districts located across Nebraska that contain solitary Class A high schools. Another commonality is that the districts and schools in question do not employ science-specific instructional coaches. The four districts utilized in this study will be described using the letters A, B, C, and D to denote them confidentially. District A is located in eastern Nebraska in a distant town with a population of 26,483 individuals. The district, comprised of 4,754 students, is made up of 13 schools, including eight elementary schools, one middle school, and a single high school. Teachers within this district are on a three-year evaluation cycle, with a summative evaluation year following two “growth” years. The district currently has its own evaluation framework model but is looking to change soon. District A employs one general instructional coach at the high school level, whose role is to work with new teachers in the building, as well as with teachers during the growth years of their evaluation cycle.

District B is located in south-central Nebraska in a distant town with a population of 32,217 people. The district is made up of 5,374 students and 14 schools, including 10 elementary schools, two middle schools, and one high school. Teachers within the district are on a four-year evaluation cycle, with formative evaluations every year and a summative evaluation every fourth year. This district utilizes the teacher evaluation framework of Charlotte Danielson to guide administrators in the classroom. District B employs one general instructional coach at the high school level, providing content-
neutral supports for new and struggling teachers, as well as supports with technology integration. Due to budget cuts, this district will not employ instructional coaches after the 2017-2018 school year.

District C is located in a remote town of north-eastern Nebraska with a population of 24,393 individuals. The district has 4,199 students and 11 schools, separated into seven elementary schools, two middle schools, and a single high school. Tenured teachers rotate on a three-year evaluation cycle with annual SMART goals and a summative evaluation every three years. District C currently utilizes an APL Instructional Framework to guide their teachers, but will be working toward a district-designed model soon. Administrators of the district use Charlotte Danielson’s evaluation framework to guide their instructional leadership actions. District C does not employ any instructional coaches.

Finally, District D is located in a remote town of south-central Nebraska, populating 24,420 people. The district is comprised of 4,280 students and 12 schools, including nine elementary schools, two middle schools, and one high school. Tenured teachers are on a three-year evaluation cycle including one formative and one summative observation during each cycle. The Danielson model has been used in this district as the evaluation framework for many years, but a transition is being made during the current school year to the Marzano model because of the evaluation tool that is provided. District D does not utilize instructional coaches to work with teachers. Table 2 outlines the demographics of each high school to be utilized in this study.
Table 2.

High school characteristics of student enrollment, demographics, and number of teachers

<table>
<thead>
<tr>
<th></th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>1,440</td>
<td>1,439</td>
<td>1,260</td>
<td>1,226</td>
</tr>
<tr>
<td>Student Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>0.63</td>
<td>1.39</td>
<td>0.87</td>
<td>0.65</td>
</tr>
<tr>
<td>Black</td>
<td>0.97</td>
<td>2.71</td>
<td>2.78</td>
<td>1.06</td>
</tr>
<tr>
<td>Caucasian</td>
<td>69.38</td>
<td>80.75</td>
<td>64.34</td>
<td>79.36</td>
</tr>
<tr>
<td>Hispanic</td>
<td>27.71</td>
<td>13.06</td>
<td>25.12</td>
<td>14.85</td>
</tr>
<tr>
<td>Multiracial</td>
<td>0.76</td>
<td>1.32</td>
<td>3.17</td>
<td>3.67</td>
</tr>
<tr>
<td>Native American/</td>
<td>0.42</td>
<td>0.69</td>
<td>3.17</td>
<td>0.33</td>
</tr>
<tr>
<td>Alaska Native</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free or reduced-price lunch eligible</td>
<td>50.56</td>
<td>34.68</td>
<td>47.46</td>
<td>38.99</td>
</tr>
<tr>
<td>Students eligible for special education</td>
<td>17.0</td>
<td>14.0</td>
<td>14.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Students with limited English proficiency</td>
<td>6.60</td>
<td>1.25</td>
<td>3.81</td>
<td>0.0</td>
</tr>
<tr>
<td>Students who graduate on time (in 4 years)</td>
<td>87.0</td>
<td>94.0</td>
<td>88.0</td>
<td>88.0</td>
</tr>
<tr>
<td>Number of classroom teachers</td>
<td>85</td>
<td>88</td>
<td>79</td>
<td>72</td>
</tr>
</tbody>
</table>

Secondary Science Teachers

All secondary science teachers from the chosen Nebraska school districts were asked to participate in a survey to examine perceptions, experiences, and needs as they pertain to the teacher evaluation process and the concept of content-specific feedback. Science teachers within the researcher’s school district were not selected to avoid the introduction of bias or influence in perception answers. As the involvement of schools with instructional coaches may introduce a confounding variable to the current study, participants were chosen only from schools or districts who do not employ science-based instructional coaches. The resulting secondary science teachers chosen for participation in this study numbered 36, from four different schools, within four districts across the state of Nebraska. Demographic information requested from each participant included gender, number of years employed in current school district, number of years as a
classroom teacher, and basic information on experience with various teacher evaluation systems, evaluators, and level of motivation for professional development. Study participants were contacted by email, informed of the purpose of the survey, and provided with a link to the web-based survey. The researcher communicated to the science teachers that the purpose of the study was to gain perception data on their experiences with feedback and their needs when it came to professional growth. Participants understood that their responses would be anonymous and unidentifiable and that their participation was completely voluntary.

**Secondary Administrators**

High school administrators were selected for study by their instructional leadership role within a collection of the four aforementioned school districts across Nebraska. Administrators chosen to complete the ASES-S survey needed to play an evaluative role within their school, and, specifically, they needed to have evaluated and offered feedback to science teachers at some point during their administrative career. Administrators were not selected from the researcher’s school district in order to avoid any bias or influence in perception answers. Only administrators from schools without science-focused instructional coaches were selected for survey data. The purpose for this restriction of administrator data collection was to remove the confounding variable of content coaches in providing content-specific supports in a non-evaluative manner. The resulting secondary administrators invited for participation in the study numbered 16, from four different schools, within four districts across the state of Nebraska. Demographic information requested from each participant included gender, number of years employed in current school district, current position, number of years spent in
current position, number of years in administration, number of years as a classroom teacher, and teaching content certification. Study participants were informed of the purpose of the web-based study and the survey link through email. Administrators were made aware that the purpose of the study was to see what perceptions existed about the provision of content-specific feedback in a secondary science classroom. Administrators were also made aware that their participation in the survey was voluntary and that their responses would remain anonymous.

**Science Teacher Instrumentation**

This study will employ a source of instrumentation to be utilized with secondary science teachers, namely a survey of perceptions concerning experiences with the teacher evaluation process. The instrument used in this study (Teacher Evaluation Experience Scale-Feedback (TEES-F)) was adapted for use from the *Teacher Evaluation Experience Scale-Teacher Form (TEES-T)*. The TEES-T survey was originally created by Reddy, Dudek, Kettler, Kurz, & Peters (2016) to measure teacher satisfaction with the teacher evaluation process and allow schools and districts to pinpoint components of evaluation systems that need improvement. Ideally, this instrument was created to be periodically administered to teachers for the purposes of continuous improvement of a teacher evaluation system that involves every classroom teacher. The adapted TEES-F survey can be broken down into 20 Likert-scaled questions and an open-ended section designed to gather both qualitative and quantitative data of teacher perceptions. Questions 1-9 asked specifics about feedback offered, 10-13 focused on evaluator competency, 14-17 examined perceptions in the light of content, and 18-20 examined the teacher’s perceptions of his/her overall satisfaction with evaluation feedback as well as his/her
motivation to change as a result of the feedback received. Eight open-ended questions asked for more detailed information about the type of feedback offered, the type of feedback that would lead to professional growth in the science classroom, and teacher needs for professional development alongside implementation of the Nebraska College and Career Ready Standards for Science being incorporated in the spring of 2018.

*Teacher evaluation experience scale-Teacher form (TEES—T)*

The *TEES-T* was created by Reddy, et al. (2016) to measure teacher perceptions about teacher evaluation practices, and designed to be used on a regular basis to guide continuous improvement of the teacher evaluation system itself. The original *TEES-T* consisted of 39 questions split into four categories: System (1-10), Feedback (11-25), Process (26-33), and Motivation to Change (34-39). The survey included 583 Pre-K-12 teacher participants from 22 schools across four high-poverty districts within New Jersey. Items were scored on a 5-point Likert scale. Overall, the *TEES-T* displayed good internal consistency, survey items free from bias, and convergent validity with the Collective Efficacy Scale (CES) (Goddard, et al., 2000). Internal consistency was measured using Cronbach’s alpha and calculated for both the *TEES-T* total scale and each of the four sub-scales. Total scale (0.97), and the four sub-scales of System (0.95), Feedback (0.95), Process (0.90), and Motivation to Change (0.86) all were found to have good internal consistency. Internal structure validity was examined with confirmatory factor analysis, conducted using a generalized least squares estimation with AMOS (version 19). Model fit was based on chi-square, root mean square error of approximation, adjusted goodness of fit index, goodness of fit index, and comparative fit index. Validity was estimated using item bias and correlations with CES. A partial correlation model (Reynolds &
Carson, 2005) was used to identify potential bias based on teacher age, educational degree, and years of teaching experience. The partial correlations were not statistically significant, indicating that TEES-T items would function similarly across the three teacher groups mentioned above. Convergent validity examined correlations between the TEES-T and the CES, finding moderate positive correlations between total scores for both scales.

**Teacher evaluation experience scale-Feedback (TEES-F)**

This study utilized an adapted form of TEES-F to examine teacher perceptions of the evaluation process. The researcher modified the original instrument by removing original section headings and focusing the survey on the feedback questions that were most concentrated on the research at hand. Evaluator-based questions 10-13 were modified from a Teacher Attitude Survey (Coleman, 1992) and specified for this study’s purposes by specifying content-neutral and content-specific competencies and knowledge. The “content” section includes questions 14-17 created by the researcher to incorporate the types of feedback received (content-neutral or content-specific), the expertise of the evaluator (content expert or non-content expert), and whether the feedback was incorporated into the classroom teaching. These questions arose from research showing that the expertise of their evaluators might determine whether teachers integrate any offered feedback suggestions into their teaching (Lochmiller, 2016; Lochmiller & Acker-Hoevever, 2016). Three questions were added into the “feedback” section to specify whether or not feedback was offered (question 1), if feedback offered helped to improve content-specific instructional effectiveness (question 6), and if
evaluation feedback was aligned with pedagogy (question 7) as opposed to the subject matter that was already present as an item in the original instrument.

Open-ended questions from the modified TEES-F instrument were adapted from one question from the Teacher Attitude Survey (Coleman, 1992) and three questions from an interview protocol used by Lochmiller (2016). The researcher created four open-ended questions to address teacher desires on whether they wanted content-specific and/or content-neutral feedback, the types of feedback they needed to grow professionally, and whether or not their evaluator was capable of providing that necessary feedback. These questions were created to provide more direct, detailed answers to the study’s main research question, namely what quality feedback looks like in a secondary science classroom.

**Focus Group**

A focus group of six individuals gathered to examine the modified TEES-F instrument. The individuals chosen to participate were professionals in the field of education, with titles such as science teacher, doctoral student, administrator, Marzano instructional coach, science instructional coach, science department head, and secondary instructional facilitator. The group met in person to offer feedback and dialogue concerning the teacher survey instrument. Participating individuals were asked for feedback related to spelling, grammar, word choice, instrument clarity, focus, and the idea that the instrument should provide answers to the research questions posed as well as parallel the other instrument being used. After meeting, suggested changes were made and modified research questions and instruments were sent back out to focus group
members for one final examination and approval. None of the focus group individuals were chosen to participate in the data collection for this study.

Based on focus group feedback, the following modifications were made to the TEES-F teacher instrument: (1) a survey and open-ended item were modified to become demographic questions, (2) Likert scale notations were simplified throughout the survey, (3) questions deemed repetitive or unnecessary were removed, (4) minor word choice modifications were made, (5) category headings considered unnecessary and confusing were removed, (5) survey items were re-ordered to make more sense once category headings were removed, (6) open-ended questions were reworded to elicit a more detailed qualitative response, (7) related survey items were connected with to each other with “a” and “b” labels, (8) survey items were re-ordered to mention “content-neutral” and “content-specific” questions in the same order throughout instrument, and (9) an open-ended question was added to parallel an administrator survey question about Nebraska’s College and Career Ready Standards for Science. These instrument changes were emailed to focus group members and one additional modification was suggested: Related survey item choice “b” will only come to survey participants if they choose a “3, 4, or 5” on item “a”. However, this was not a possibility with the online tool used to create the TEES-F instrument. The adapted instrument, TEES-F, was not formally validated, but because adaptations were primarily changed for demographic and analysis purposes, the changes were fairly minor.

**Survey Administration**

Science teachers of participating districts and schools were emailed a link to a Google Form of the instrument, along with directions on how to complete the survey.
This email was sent to participants with a one and a half week deadline to complete. The researcher sent a reminder email toward the deadline, and then another email the following week to allow more time for late responders. The TEES-F survey took participants approximately 20 minutes to complete.

**Administrator Instrumentation**

This study adapted a self-efficacy survey to examine administrator comfort levels with various aspects of instructional leadership, including that of providing feedback to teachers. The Administrator Self-Efficacy Survey for Science (ASES-S) was derived from the *Administrator Self-Efficacy Survey for Mathematics* (ASES-M) (Johnson, 2017), which was originally modified from the *Principal Self-Efficacy Survey* (PSES), a survey developed and validated by Smith and Guarino (2006). The ASES-S can be broken down into three main sections: nine Likert-scaled questions concerning administrator self-efficacy with general instructional leadership actions, nine Likert-scaled questions that paralleled the first nine questions with a specific focus on science instructional leadership, and five open-ended questions modified from Johnson (2017), Lochmiller (2016), and Lochmiller and Acker-Hocevar (2016) that focused on what types of feedback were offered and how that feedback was focused for science instruction.

**Principal self-efficacy survey (PSES)**

The PSES was based on a *Teacher Self-Efficacy Survey* (TSES) created by Tschannen-Moran, Hoy, and Hoy (1998) to examine the relationship between teacher self-efficacy and the effect it had on the teaching and learning in a classroom setting. The PSES was designed to examine self-efficacy at the level of instructional leadership and working with teachers. The original PSES survey consisted of 14 items, with nine items
addressing Instructional Leadership and five items examining Management Skills (Smith & Guarino, 2006). The survey was completed by 284 principals within 12 states, consisting of elementary, middle, and high school administrators. Items were scored using a 1-4 Likert-type scale. Construct and discriminate validity was determined by the authors using various methods. A confirmatory factor analysis was conducted using AMOS version (5.0) and fit measures were ordered as absolute, relative, parsimonious, and population discrepancy. Absolute fit measures were examined using a chi-squared test, while relative fit measures were examined using the Comparative Fit Index (Bentler, 1990) and the Tucker-Lewis Index (Bentler & Bonett, 1980). Parsimonious fit measures were determined by overfitting the data to the model and then utilizing the chi-square divided by the degrees of freedom, or sample size. Population discrepancy was determined using the Root Mean Square Error of Approximation (RMSEA) (Browne & Cudeck, 1993). The RMSEA value was 0.049, an indication of a close fit between sample and population coefficients. A correlation of 0.69 between the factors was a sign of discriminate validity.

Administrators’ self-efficacy survey for mathematics (ASES-M)

The ASES-M (Johnson, 2017) was adapted from the PSES of Smith and Guarino (2006), with content-specific items added that paralleled content-neutral instructional leadership items 1-10 of the PSES. The ASES-M also included eight questions related to mathematics instructional leadership and three open-ended questions to inform other data collection within the study. Two pilots were conducted to allow for examination of ASES-M by professional educators. Internal consistency was examined using Cronbach’s alpha, resulting in high levels of internal consistency within the instructional leadership
questions (0.806) and mathematics instructional leadership (0.962). The ASES-M survey was completed by 24 elementary administrators within a single district in the state of Nebraska. Descriptive statistics, such as mean, mode, and standard deviation, were examined for administrator self-efficacy perceptions. Independent samples t-tests were calculated for each survey item to determine the difference of means for each factor.

**Administrators’ self-efficacy survey for science (ASES-S)**

Based on the original work by Smith and Guarino (2006) and the adaptation by Johnson (2017), the Administrators’ Self-Efficacy Survey for Science (ASES-S) was further modified by changing “math” or “mathematics” in ASES-M to “science,” creating parallel content-neutral versions (ASES-S items 10-18) of Likert items generated by Johnson (2017) to examine mathematics instructional leadership, and adding open-ended questions from Lochmiller (2016) and Lochmiller and Acker-Hocevar (2016). The researcher also created four open-ended questions (ASES-S items 19, 20, 22, 23) to ask administrators for more pointed information about what types of feedback they offer science teachers, what types of feedback they think science teachers need to grow professionally, whether or not they feel capable of providing such feedback, and what awareness or training they have had to accommodate science-specific instructional leadership with regards to Nebraska College and Career Ready Standards for Science becoming available in the spring of 2018. These questions were created to address the dearth of information concerning content-specific leadership practices as described in the literature (Lochmiller, 2015; 2016; Lochmiller & Acker-Hocevar, 2016; Lochmiller, et al., 2012; Rasmussen, 2017).
Focus Group

The same focus group that helped modify the TEES-F instrument worked on the ASES-S instrument as well. Once again, these individuals were chosen for their expertise in the field of education, with all members having expertise in science instruction, as well as holding additional leadership or instructional coaching roles. The group met in person to offer feedback concerning the administrator survey instrument, with a focus on spelling, grammar, word choice, instrument clarity, focus, and to examine whether the items would provide answers to the research questions posed as well as parallel the other instrument being utilized with teachers. After meeting, suggested changes were made and modified research questions and instruments were sent back out to focus group members for one final examination and approval. None of the focus group individuals were chosen for participation in the data collection for this study.

Based on focus group feedback, the following modifications were made to the ASES-S administrator instrument: (1) minor word choice modifications, (2) Likert scales were modified to mimic the teacher instrument (TEES-F), (3) Likert scale notations throughout the survey were simplified, (4) open-ended questions were re-ordered, (5) three open-ended questions that were deemed repetitive were removed, and (6) terminology was altered in an open-ended question to refer to the new Nebraska science standards instead of Next Generation Science Standards. These changes were emailed to focus group members and approved without additional modifications. Similar to the science teacher instrumentation, the adapted instrument for administrators, ASES-S, was not formally validated, but able to be utilized because only minor changes were made for demographic and analysis purposes.
Survey Administration

Study participants were sent an email with a link to the ASES-S instrument on a Google Form with instructions on how to complete the survey. Administrators were given one and a half weeks to complete the survey, with a reminder email sent toward the end of the time frame. Participants who had not yet completed the survey were sent one additional reminder email the following week with additional time for survey completion. The ASES-S survey took approximately 20 minutes for administrators to complete.

Data Collection and Analysis by Research Question

Sub-Research Question 1 (SRQ1): What type of feedback, as demonstrated through TEES-F completion, do secondary science teachers report needing for professional growth to occur?

Sub-research question one allowed for teacher voice in their own professional growth. It might be that a certain type of feedback exists that can propel secondary science teachers to the next level of science instruction. If that is the case, the first step to unlocking that information is to ask the teachers what they think would help them, as far as feedback is concerned. Data collected for SRQ1 was qualitative in nature and collected from TEES-F survey items 26, 27, and 28b concerning what teachers specifically desire from their feedback discussions, with pointed questions about how they would respond to content-neutral and content-specific feedback. Ideally, quality feedback from administrators leads to improvements in science teacher effectiveness in the classroom or otherwise specialized secondary environment. SRQ1 offered direct teacher responses to the type of feedback desired from administrator evaluators, thus specifying, from a
science teacher’s perspective, what quality feedback in a secondary science classroom should look like.

**Sub-Research Question 2 (SRQ2):** How (qualitative), as demonstrated through TEES-F and ASES-S completion, does content-specific feedback differ from content-neutral feedback in a secondary science classroom?

Sub-research question two addressed a major component of this study’s framework, and focused on the differences that exist between content-neutral and content-specific feedback. This question was addressed by examining qualitative data from open-ended questions in the adapted TEES-F (items 23, 23a, 23b, 23c, and 23d) and ASES-S (items 19 and 20) surveys given to secondary science teachers and administrators, respectively. This question was not examined in a quantitative manner because there were no Likert-scaled items appropriate for addressing the question in such a way.

The open-ended questions designed to answer this sub-research question asked about what typical feedback during an evaluation conversation looks like and then gathered specific examples of both content-neutral and content-specific feedback that teachers have received and administrators have offered during prior feedback experiences. Upon the receipt of various examples of each type of feedback, common themes were examined, and differences between content-neutral and content-specific feedback were identified. Teacher perceptions of each type of feedback offered and whether it was pertinent to instructional improvement added to the overall discussion of what quality feedback should look like in a specialized setting.
Sub-Research Question 3 (SRQ3): How (qualitative) and to what degree (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-neutral feedback?

Sub-research question three is examining perceptions of secondary science teachers concerning the content-neutral knowledge of their evaluators and the ability for these administrators to translate that knowledge of general pedagogy and classroom management practices into quality feedback. Qualitative data was isolated from open-ended responses to TEES-F items 22b, 23d, 24, and 27 discussing the background and training related to the administrator evaluator and whether they can deliver adequate content-neutral feedback for professional growth. Quantitative data was collected from TEES-F survey items 5, 7, 10, 11, 14a, 14b, 16a, and 16b concerning science teacher opinions on whether their evaluator has had sufficient pedagogical training and if their feedback has helped teachers improve their general instructional effectiveness. Qualitative data was examined for common emerging themes and quantitative data was analyzed using descriptive statistics. This question helped the researcher address the idea of administrator abilities to offer effective feedback as it pertains to general pedagogy.

Sub-Research Question 4 (SRQ4): How (qualitative) and to what degree (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-specific feedback?

The fourth sub-research question addressed one of the major concerns of this study, namely whether secondary administrators have the necessary pedagogical content knowledge to offer content-specific feedback, as well as whether secondary science teachers perceive administrators in that capacity. Do teachers have administrators
offering content-specific feedback, and, if so, did they see that administrator in a capacity that enabled them to incorporate the feedback into their classroom instruction?

Qualitative data was collected from open-ended questions on the TEES-F (items 22, 22a, 22b, 23d, 25, and 27) survey discussing the nature of the content-specific feedback provided, and if it was useful feedback for teacher improvement in content instruction.

Quantitative data was collected from TEES-F items 6, 8, 12, 13, 15a, 17a, and 17b pertaining to whether feedback from administrators was aligned with content area and if the feedback led to improvements in content-related instructional effectiveness.

Quantitative data was analyzed using descriptive statistics, with a discussion of the mean, mode, and standard deviation of teacher responses. Common themes were isolated from qualitative answers and compared to quantitative results for consensus. The degree to which secondary science teachers perceive the capacity of their administrator evaluator to provide quality content-specific feedback as well as the usefulness of that directed feedback will inform the overall study question to what quality feedback needs to look like in a specialized setting. When this data collection and analysis is compared with that of SRQ3, an image of administrator capacity as seen through the eyes of the teachers they are supervising begins to appear. This image of administrator capacity works to create an image of what administrators can and should be doing to help improve science teaching in their buildings.

**Sub-Research Question 5 (SRQ5):** How (qualitative) and to what extent (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive their satisfaction with feedback offered through teacher evaluation?
This fifth sub-research question examined perceptions of secondary science teachers concerning experiences they have had with receiving feedback within the structure of teacher evaluation. Qualitative data was collected from open-ended survey questions (TEES-F items 21, 21a, and 27) breaking down the feedback received by participants and the impact it has had on their classroom teaching. Quantitative data was collected using categorical, ordinal questions from TEES-F items 2-6, 14b, 15b, 16b, 17b, and 18-20 as they related to the system and process of evaluation as well as perceptions concerning feedback, content-relatedness, and evaluator capacity. Quantitative data was analyzed using descriptive statistics with discussions of the mean, mode, and standard deviation of participant responses. Common themes were identified and checked for consensus between quantitative and qualitative data. This portion of data collection and analysis was designed to provide current teacher perceptions of administrator feedback in a specialized setting.

Sub-Research Question 6 (SRQ6): How (qualitative) and to what degree (quantitative), as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-neutral feedback to science teachers?

Sub-research question six switched the focus to administrator perceptions in terms of their self-efficacy in providing feedback to teachers through the teacher evaluation process. As administrators are historically trained in a content-neutral manner, the first administrator-based question addressed self-efficacy in this light. Qualitative data was collected through an open-ended question (ASES-S item 22a) examining administrator perceptions of what feedback generally looks like. Data was explored for common
themes across administrator responses. Quantitative data was collected from administrator responses to ASES-S items 1-9. Administrators were asked to rate their self-efficacy through categorical, Likert-scaled items relating to their general ability to influence teaching from a content-neutral standpoint. Quantitative data will be analyzed using descriptive statistics, with discussions of the mean, mode, and standard deviation of administrator responses. There was also a general comparison between administrator responses to SRQ6 and teacher perceptions of content-neutral administrator capacity from SRQ3. The examination of administrator self-efficacy in providing generic instructional supports painted a picture of administrator experience in working with teachers to improve their instructional effectiveness. This question also provided a baseline for comparing data between this question and SRQ7, which examined administrator self-efficacy with content-specific aspects of instructional leadership. Examining administrator self-efficacy in providing content-neutral feedback to teachers highlighted the ways in which experience, prior training, and instructional leadership work to provide supports in every secondary classroom, regardless of specialization.

**Sub-Research Question 7 (SRQ7):** How (qualitative) and to what degree (quantitative), as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-specific feedback to science teachers?

Sub-research question seven focused on administrator self-efficacy with regards to the supports provided in a specialized secondary setting. By examining administrator perceptions in providing content-specific feedback, this study gained an understanding of how administrators take content into consideration as they offer feedback through the
process of teacher evaluation. The researcher can compare information gathered to teacher perceptions of administrator capacity to provide content-specific feedback (SRQ4) as well as teacher descriptions of what type of feedback they need to grow as professionals in the secondary science classroom. Commonalities were noted, and any discrepancies examined to see what supports administrators might provide for more focused growth opportunities.

Qualitative data to address SRQ7 was collected from open-ended ASES-S survey items 21 and 22a, examining administrator perceptions of effective science instruction “look fors”. To further explore SRQ7, quantitative data was collected from ASES-S item 10-18 responses on the self-efficacy of administrators as it pertained to offering specific content supports to science teachers in science classrooms. Data collected was analyzed using descriptive statistics and then compared to the corresponding content-neutral ASES-S responses from administrators in SRQ6. A paired samples t-test was used to compare administrator answers between the content-neutral (items 1-9 in SRQ6) and content-specific (items 10-18 in SRQ7) portions of the ASES-S survey. Exploring how administrator content specializations influence the feedback offered in a secondary science setting provided the researcher with information regarding perceptions of the importance of content-specific supports. When combined with teacher perceptions, SRQ7 helped to complete the story (for the purposes of this study) of what quality feedback looks like in a specialized secondary setting.

Data Analysis

Qualitative data responses were collected from TEES-F open-ended questions and examined for common emerging themes in the responses of secondary science teachers.
Quantitative data from the same participants was concurrently collected from TEES-F Likert-scaled questions and analyzed using descriptive statistics, such as mean, mode, and standard deviation. Resulting qualitative and quantitative data were compared to see if there was agreement between the two. Likewise, qualitative responses from secondary administrators were collected using open-ended responses from the ASES-S instrument, and examined for common themes. Quantitative data was also collected concurrently from the same administrator participants through Likert-style questions, and analyzed using descriptive statistics. Common themes from qualitative responses were compared to quantitative survey results to check for consensus between the data types. The basic assumption in using this convergent research design is that the two distinct types of data will “converge” in the discovery of singular results (Creswell, 2012; 2014).

Qualitative data measures were used to examine research questions SRQ1 through SRQ7. Data screening was conducted on open-ended questions from both TEES-F and ASES-S instrument completion. Thematic coding was carried out, and common themes analyzed while identifying emergent ideas. Quantitative data measures were used to examine research questions SRQ3 through SRQ7. Secondary science teacher participant data from TEES-F allowed for data screening of Likert-scaled answers using descriptive statistics, such as mean, mode, and standard deviation. Secondary administrator data gathered from ASES-S was also examined in a similar way using descriptive statistics. Qualitative and quantitative data was analyzed together to check for convergence. Qualitative and quantitative data were analyzed for science teachers and administrators separately, and then common trends and themes were examined between teachers and administrators, as well as between content-neutral and content-specific data.
Ancillary Data Analysis

Additional descriptive statistics and paired and independent samples t-tests were calculated for data separated by information other than the sub-research question answered. For example, quantitative data from secondary science teacher participants was separated by gender to gauge TEES-F response effects, if any. Science teacher responses were also separated by those interested in actively pursuing professional development, and those who were not. Quantitative data from administrator participants was separated by content specialization and leadership title. Administrator responses on ASES-S items were compared between those with experience teaching in a science classroom and those with alternate content specialties. Administrator responses were also divided into those provided by head principals and those of assistant principals. These additional statistical comparisons were thought to potentially affect both TEES-F and ASES-S survey responses and involved simple data table reorganization to carry out.
Chapter 4: Results

Survey Administration

The TEES-F and ASES-S surveys were sent electronically to a total of 36 high school science teachers and 16 administrators, respectively, among 4 high schools in 4 districts throughout the state of Nebraska. Surveys were sent out between 11/12/17 and 11/27/17 depending on whether I was allowed to send the survey links myself or if it was requested that they be sent by school district personnel. Teachers and administrators were invited to participate and given a week and a half to complete the survey. A reminder email was sent out between 11/29/17 and 12/4/17 and another week and a half given in an attempt to get as many responses as possible. Survey responses were not accepted after 12/22/17. Teachers and administrators were under no obligation to participate or to answer every question on the survey. Therefore, there may be some survey items that yielded a lower number of responses than the total number of participants for this reason.

Demographics of Samples

A total of 52 secondary science teachers and administrators were invited to participate in 1 of the 2 surveys, with a final participation number of 38 and a total response rate of 73.1%. Secondary science teacher responses to the TEES-F survey totaled 26 participants with a response rate of 72%. Response rates of science teachers from each school ranged from 50% to 100% participation. A total of 12 administrators responded to the ASES-S survey, resulting in a response rate of 75%. Response rates for administrators ranged from 40% to 100%, when broken down by school.

Each survey included basic demographic questions to help paint a more complete picture of additional characteristics that may play a role in shaping perceptions or
practices of either receiving or providing feedback in a secondary science classroom.

Demographic questions for the TEES-F survey of science teachers included items such as gender, number of years in his/her current school district, number of years as a classroom teacher, specific content certification area, previous experience with teacher evaluation, and whether he/she actively seeks out professional development opportunities.

Demographic questions for the ASES-S survey of administrators also included similar questions like gender and number of years in his/her current school district, with additional questions pertinent to administration, such as the participant’s current position, number of years in current position, number of years in administration, number of years as a classroom teacher, and area of teacher certification. Some of these demographic questions became the focus of certain ancillary statistics during the data analysis portion of the study. Table 3 shows more details on demographic information and breaks down the participants between schools studied.

Table 3.

<table>
<thead>
<tr>
<th>Demographics of study participants</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
<th>Total</th>
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</thead>
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<tr>
<td>All participants</td>
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<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
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<tr>
<td></td>
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<td>9 (23.7)</td>
<td>11 (28.9)</td>
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<td>Response Rates</td>
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<td>8/13 (61.5)</td>
<td>9/14 (64.3)</td>
<td>11/11 (100.0)</td>
<td>38/52 (73.1)</td>
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<td>Science Teachers</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
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<td></td>
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<td>7 (26.9)</td>
<td>8 (30.8)</td>
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<td>7/9 (78.0)</td>
<td>8/8 (100.0)</td>
<td>26/36 (72.0)</td>
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<td>0 (0.0)</td>
<td>2 (16.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years as classroom teacher</th>
<th>1-5</th>
<th>1 (25.0)</th>
<th>1 (33.3)</th>
<th>0 (0.0)</th>
<th>3 (100.0)</th>
<th>5 (41.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10</td>
<td></td>
<td>1 (25.0)</td>
<td>2 (66.7)</td>
<td>1 (50.0)</td>
<td>0 (0.0)</td>
<td>4 (33.3)</td>
</tr>
<tr>
<td>11-15</td>
<td></td>
<td>2 (50.0)</td>
<td>0 (0.0)</td>
<td>1 (50.0)</td>
<td>0 (0.0)</td>
<td>3 (25.0)</td>
</tr>
</tbody>
</table>

| Science expertise             | 1 (25.0) | 1 (33.3) | 1 (50.0) | 1 (33.3) | 4 (33.3) |
Instrumentation

Both TEES-F and ASES-S surveys included Likert questions in their quantitative portions with a 5-point scale distribution of Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). The quantitative portion of the ASES-S survey was broken into 2 parts: a content-neutral instructional leadership self-efficacy section, and a science-specific instructional leadership self-efficacy portion with items parallel to the general section. Internal Consistency was measured between these two sections of the ASES-S survey by utilizing Chronbach’s Alpha. For the content-neutral instructional leadership portion (ASES-S items 1-9), Cronbach’s Alpha was equal to 0.869, with a value of 0.966 for the science-specific instructional leadership section of the survey (ASES-S items 10-18). This is an indication of a high level of internal consistency between the two parallel survey sections.

Research Questions and Data Analysis

Upon receipt of completed science teacher and administrator surveys, confidentiality was maintained by removing any potential identifiers (email addresses and mentions of school names or people) and replacing them with an identifying number for each participant. Science teachers were coded from 1-26 and administrators were coded from 1-12, with data from respective surveys kept isolated from each other to avoid confusion. For the purposes of qualitative analyses, a data table with participant responses was printed to be separated based on survey items. Before cutting the data table into pieces, responses were coded by participant and survey item number. For example, the first open-ended question on the TEES-F survey would be coded as such with participant number preceding survey item number: 1-21a, 2-21a, 3-21a, and so on.
Survey items were not designed to be dependent upon each other, but periodically it was necessary to see what Teacher 1 said in 1-21a before 1-21b made sense to the researcher. With the coding method utilized, this comparison was possible when needed. Table 4 illustrates the mode of analysis for each of the seven sub-research questions posed during the study. As qualitative responses are shared throughout this chapter, it is important to note that quoted entries have not been modified in any way from their original submission, typos included. The reasoning for this was to preserve the unique voice of each participant without modifying his/her message by changing the wording used.

Table 4.

*Analytic model for data analysis*

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Type of Data</th>
<th>Statistical Tests</th>
<th>Compare/Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRQ1</td>
<td>QUAL: TEES-F: 26, 27, 28b ASES-S: 22, 23b QUAN: None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of feedback needed</td>
<td></td>
<td>Data Screening, Thematic Coding</td>
<td>Compare TEES-F: 26, 28b to ASES-S: 22, 23b</td>
</tr>
<tr>
<td>SRQ2</td>
<td>QUAL: TEES-F: 23, 23a, 23b, 23c, 23d ASES-S: 19, 20 QUAN: None</td>
<td>Data Screening, Thematic Coding</td>
<td>Compare: -TEES-F: 23a to 23c -ASES-S: 19 to 20</td>
</tr>
<tr>
<td>Content-Neutral (CN) vs. Content-Specific (CS)</td>
<td></td>
<td></td>
<td>Compare TEES-F to ASES-S responses</td>
</tr>
<tr>
<td>SRQ3</td>
<td>QUAL: TEES-F: 22b, 23d, 24, 27 QUAN: TEES-F: 5, 7, 10, 11, 14a, 14b, 16a, 16b</td>
<td>Data Screening, Thematic Coding</td>
<td>Compare: -TEES-F: 24 to 25 -TEES-F: 27 to ASES-S: 22a (SRQ6) Descriptive Statistics—Mean, Mode, Standard Deviation</td>
</tr>
</tbody>
</table>
SRQ4
Administrator Capacity for CS Feedback

QUAL: TEES-F: 22, 22a, 22b, 23d, 25, 27

QUAN: TEES-F: 6, 8, 12, 13, 15a, 15b, 17a, 17b

Data Screening, Thematic Coding

Compare: -TEES-F: 25 to 24
-TEES-F: 27 to ASES-S: 22a (SRQ7).

T-Test to compare SRQ3 & SRQ4

SRQ5
Feedback Satisfaction

QUAL: TEES-F: 21, 21a, 27

QUAN: TEES-F: 2, 3, 4, 5, 6, 9, 14b, 15b, 16b, 17b, 18, 19, 20

Data Screening, Thematic Coding

Compare TEES-F: 20 with combination of all items

SRQ6
Administrator Self-Efficacy for CN Feedback

QUAL: ASES-S: 22a

QUAN: ASES-S: 1, 2, 3, 4, 5, 6, 7, 8, 9

Data Screening, Thematic Coding

Compare ASES-S: 22a to TEES-F: 27 (SRQ3)

SRQ7
Administrator Self-Efficacy for CS Feedback

QUAL: ASES-S: 21, 22a

QUAN: ASES-S: 10, 11, 12, 13, 14, 15, 16, 17, 18

Data Screening, Thematic Coding

Compare ASES-S: 22a to TEES-F: 27 (SRQ4)

Contrast with SRQ6 (ASES-S: 1-9)

T-Test to compare SRQ6 & SRQ7

Sub-Research Question 1 (SRQ1)

SRQ1: What type of feedback (qualitative), as demonstrated through TEES-F completion, do secondary science teachers report needing for professional growth to occur?

Twenty secondary science teachers responded to TEES-F survey items 26, 27, and 28b to address this question. When asked directly what type of feedback was needed to grow as a science teacher, two participants (10%) responded that they did not require any feedback to grow. As Teacher 15 stated, “to be perfectly candid, most of my growth
as a teacher has been as a result of personal investment, reflection, and study. I can’t really imagine administrator feedback being helpful.” In their answer to TEES-F item 27 of whether their evaluator could provide the necessary feedback for growth, Teacher 15 followed with, “I think that what administrators want and what I want are pretty far apart. I want my students to love science and learn a lot, and administrators don’t talk to me about those things.”

Three science teachers (15%) responded that they would grow more from either collaboration efforts with or feedback from their fellow science peers. Teacher 25 elaborated with, “I need time with classroom instructors in my setting who are in the battle daily so we can evaluate what we are doing and what is working.” Teacher 20 responded, “I need feedback from my peers who are teaching the same things. I feel that feedback from them would be the most useful since they deal with the same content I do.” As peer coaching and Professional Learning Communities are growing in popularity, it is no surprise that some teachers are more interested in turning to each other for assistance rather than their evaluating administrator.

In their response for professional growth needs in the secondary science setting, six participants (30%) requested feedback that was content-neutral in nature, namely positive, constructive feedback with solid examples, support on chunking curriculum, and help with pacing. As Teacher 1 stated, “I feel fairly secure in my Chemistry knowledge so probably the non-content specific would be better.” In answering these survey items, it seemed that many science teachers were not expecting their evaluating administrator to be an expert in their specific science content, but appreciated the feedback that was provided as well as encouragement to continue growing in their content area, perhaps by
even passing along information about professional development opportunities. Teacher 16 focused on what might be needed when the Nebraska College and Career Ready Standards for Science are implemented in the spring of 2018: “With the new standards, I think there will be some time in between that will be a huge adjustment. As that happens, the feedback that I need to grow must always be centered on student engagement--if students are engaged through good relationships and excellent classroom expectations, I know that I will find a way to convey the material and build their skills as we construct assessments and real life learning experiences.” Finally, within this group of content-neutral requests for feedback was more of a solution-seeking request for administrators: “Solution ideas for overcrowded classrooms and teaching load. We are pushed to our limits with more students and more classes. I believe eventually teachers will burnout or find ways to cope that doesn't provide the students with their best experience” (Teacher 22).

One secondary science teacher (5%) shared needs for both content-neutral and content-specific feedback to grow professionally, while eight (40%) made specific requests for content-specific feedback for growth. Of these eight requests, two participants were interested in more science-specific professional development opportunities, two were interested in feedback concerning the incorporation of the Nebraska College and Career Ready Standards for Science standards into their teaching, and four were interested in more specific feedback on the use of different approaches for reaching multiple levels of student understanding throughout specific content units. For example, Teacher 12 shared, “At this point, I feel my pedagogical skills are strong. I would always appreciate feedback on more advanced topics and if the administrator felt
there were other labs or methods of instruction worth trying to improve the learning. I am not overly concerned about this, however, because it is only a rare minority of the students who struggle with my lessons in those classes.” While Teacher 12 stated that science-specific feedback would be most beneficial for their professional growth, this was followed with a disclaimer that it was rarely a worry. This was not the case with the other three participants who requested varying approaches and ideas within the context of the content.

In comparison, when administrators were asked what type of feedback they believed secondary science teachers needed to grow professionally (ASES-S item 22), there were several mentions of content-neutral teaching strategies, which was a similar topic to responses of science teachers although different pedagogical targets were mentioned. Some of these additional aims included feedback on learning targets, differentiation, student engagement, relationship building, and assessment of knowledge. In addition, one administrator (10%) shared that purposeful growth would come from coaching or instructional rounds with peers, as is similarly stated in three science teacher responses. Two administrators (20%) replied that they believed science teachers needed content-specific feedback for growth in the classroom, thus corresponding with eight teacher responses. Elaboration on the type of content-specific feedback that would be helpful included discussions of developing inquiry skills and student interest in science, making content relevant and applicable to real world problems, checking for understanding and scientific learning instead of rote memorization, meeting kids where they are, and creating balance between lecture and hands on experiences.
With regards to the Nebraska College and Career Ready Standards for Science coming down the road and what supports will be needed for successful implementation, 21 secondary science teachers responded in a variety of ways. One participant responded that no supports were needed, two were unsure at the time of the survey, and one needed “too many [supports] to list here” (Teacher 11). Four teachers mentioned the need for support by way of providing resources for them to utilize, three focused on needing additional time to process the standards and work with curriculum, seven would rely on their peers for assistance, and six wanted professional development training opportunities to work specifically with the new standards. One science teacher requested more funding to implement the new standards and one felt the need for longer class periods to incorporate the new style of teaching and learning associated with the Nebraska College and Career Ready Standards for Science. Administrators were asked a parallel question in their ASES-S survey (item 23b), namely “Have you received any information on how to address these changes with feedback provided to science teachers through evaluation?” Nine of 10 administrators responded that they had received no information on how to support these changes through feedback, with 1 administrator responding that he had received “very little” by means of guidance on this measure.

**Sub-Research Question 2 (SRQ2)**

SRQ2: How (qualitative), as demonstrated through TEES-F and ASES-S completion, does content-specific feedback differ from content-neutral feedback in a secondary science classroom?

Teachers were asked to give specific examples of content-neutral and content-specific feedback that they had received during teacher evaluation. TEES-F item 23c
focused on specific examples of content-neutral feedback that had been received by secondary science teachers from their evaluating administrators. Twenty-one teachers answered this question, with five stating that they had no specific example that they could offer. This could be interpreted in a number of ways: these five teachers might have received no feedback through teacher evaluation, these five teachers may have received no content-neutral feedback, or these teachers simply could not come up with a specific example of feedback unrelated to their content area at the time they answered the survey question. When comparing teachers who also struggled to provide examples of content-specific feedback to share (TEES-F item 23a), these same five teachers crop up.

According to item 1 in the TEES-F survey, all five of the teachers in question indicated through their Likert response that they had received evaluation feedback at least sometimes (3) to always (5) during the evaluation process. That being said, my best interpretation of this inability to provide feedback examples is that these teachers could not think of anything at the time they answered the survey question. I do not believe that they have not received feedback based on their answers to related questions.

Eight science teachers gave specific examples of content-neutral feedback that focused on interactions with students and parents. Some of these samplings included suggestions for classroom management, student engagement, or relationship building, along with the importance of connecting more with parents. The eight remaining teachers gave examples of content-neutral feedback that focused on specific teaching strategies that could be used in the classroom context. Examples shared included the suggestions of incorporating closure, checking for understanding, “mining depth in student response” (Teacher 8), and the implementation of professional development. Two teachers shared
that their administrative feedback included some positive reinforcement of the quality of teaching they had observed in their classrooms.

Secondary science teacher responses of examples of content-neutral feedback closely mirrored the examples offered by administrators in the type of feedback that is typically provided to classroom teachers following an observation (ASES-S item 19). Three of 10 administrator responses included mentions of feedback focused on classroom management strategies, six included conversations on the importance of student/teacher relationships and student engagement in the classroom activities, three focused on suggested instructional strategies, and three made suggestions for checking for understanding or assessment strategies. Additional mention was made of observing time on task, student collaboration, technology usage, and the use of district instructional models as a guide to offering feedback. There was no mention of any content-specific strategies that would be shared with secondary science teachers. However, the ASES-S survey item was worded in broad terms of the type of feedback that is offered to classroom teachers in general, and not specific to science teachers.

By additional comparison, when science teachers were asked what administrative feedback typically focused on (TEES-F item 23), only two of the 25 responding teachers mentioned a minor focus on science content during feedback discussions. Three science teachers shared that their experiences with feedback typically focused on accountability and competency, and one simply replied, “not much” (Teacher 19). Four teachers said administrators focused on their strengths and weaknesses and how to improve from there. Student engagement and student-teacher relationships once again played a large role as 10 teachers mentioned this focus in their response. This was a similar response to that of
administrator sharing from ASES-S item 19. Six science teachers mentioned learning targets or objectives as a large feedback focus, with four others commenting about basic teaching strategies and classroom management.

When administrators were asked how their content area of expertise influenced their leadership actions, one replied that his content training did not influence his actions, while another stated that his expertise helped him offer feedback. Two administrators explained that they focused more on their district’s instructional model when offering feedback, while four administrators focused on student engagement regardless of content area. Elaborating on this point, Administrator 6 stated, “I believe that content knowledge is secondary to engaging students, being a master of questioning, and providing opportunities for students to show understanding and application over content regurgitation.” Administrator 2 explained his content influencers in the following way:

Having been an English and Physical Education teacher, I feel that I am very effective at identifying ways to engage students in the content through collaborative work and problem solving. Additionally, after conducting many classroom observations and informal walkthroughs of classes of all disciplines, I feel that I have a pretty good idea of instructional practices that work in classrooms and how they might be implemented.

Three of the four administrators with science backgrounds felt their science credentials had influenced their leadership actions in some way, but did not rely solely on that expertise to offer feedback to teachers. However, as Administrator 8 insinuated with his comment, “Feel confident in my science knowledge and can help guide instruction and curriculum,” it can sometimes be an advantage to be in an expert in a field not typically
represented in leadership positions for the high self-efficacy that can be taken into the classroom setting.

TEES-F survey item 23a asked secondary science teachers to share specific examples of content-specific feedback that had been received from administrators. Nine of the 23 science teachers who answered this question claimed they had no examples of content-specific administrative feedback to share. As previously discussed, five of these nine teachers also did not have examples of content-neutral feedback to share, even though they claim to have received evaluation feedback at least some of the time if not always. Of the remaining four teachers, one specifically stated that he/she had no example of content-specific feedback to share because “it was still general feedback” (Teacher 20). Of the 14 teachers who shared examples of content-specific feedback offered by administrators, two focused on ACT preparation, two on pacing, six were positive in nature and pointed out the impressive grasp of content and delivery observed, the connections made to the real world, or the abundance of hands-on activities and labs. Two teachers had negative examples to share of administrative feedback received, including a comment that a video shown was too unrelated to the course content, and a suggestion to “cut out’ the hard stuff in order to make it easier for more students to pass the course. They seem more concerned with graduation rates than real learning” (Teacher 13). On a more positive note, one teacher was actually asked to

Share a lesson with the faculty a few years ago on gas laws that incorporated technology, peer sharing, hands on experiences, and an evaluative question/answer summary that proved the student's understanding of the essential learnings (standards) associated with the activity. He singled that activity out, and
shared "why" it was effective with me.” (Teacher 12)

Three teachers were offered either additional resources, more examples of science concepts, or suggestions on how to improve a laboratory experience. Teacher 21 shared, “My first principle helped me with a lesson on phase changes. He brought more examples and how I could incorporate them into an anticipatory set.” When asked how this feedback was similar or different from other feedback received, Teacher 21 replied, “It was very useful for my teaching in that unit. It had a great affect [sic] on how I delivered my instruction.” Another example of content-specific feedback and the role it can play came from Teacher 24. In response to the specific example, this teacher shared, “I did a lab with light and he told me that the lamp shade was causing a color to reflect that I didn't want on the paper.” In addition, the response to how feedback was different was that “he knows about color and reflection and helped my experiment have less variables.”

As a follow-up question, science teachers were asked how this content-specific feedback was similar to or different from other feedback they had received (TEES-F item 23b). Twelve of the science teacher participants responded that the feedback they receive is the same every year. Nine of these 12 were the same teachers who had no specific example to share of content-specific feedback that they had received. Teacher 18 clearly stated, “I have not received specific feedback regarding my content area from an administrator” so there is no question as to whether some teachers have not had the experience of receiving feedback focused on science content. One teacher felt the feedback that was most useful was that received by peer coaches who “are dealing with the same issues in the classroom” (Teacher 25). Eight science teachers explained why receiving content-specific feedback in the science classroom was unique, including that
the feedback was “more tailored for my teaching” (Teacher 5) and “I think I have less explaining to do with an administrator that has content background” (Teacher 22).

Teacher 16 responded that the feedback was different because “it focused on the science of my classroom--not on the general flow of my classroom. Both were very constructive, just in different ways.” Teacher 12 was the participant who was asked to give an all-staff presentation of her lesson and replied that

> Typically, the feedback restates why something was exemplary or proficient, and ties it to the specific section of the lesson. This may have been a little more of an informal "real answer" to how tying an anticipatory set, to a verbal procedure, to the peer sharing/group activity, and closure should "look" and why it was successful. Sometimes the canned responses are generic, and could be copied and pasted to about any situation.

When secondary science teachers were asked which method of feedback, content-neutral or content-specific, was more helpful for their professional growth, teachers once again responded in a variety of ways. Of the 21 teachers who submitted an answer to this survey item (TEES-F item 23d), one replied that neither method of feedback was helpful to them. Two teachers stated that they could not answer the question because they had only experienced content-neutral feedback and had no comparison to make. Six of the participating science teachers shared a preference for content-neutral feedback from administrators. As Teacher 24 stated, “it could have been any class, it wasn't content specific but it was helpful.” Eleven science teachers said that both types of feedback were helpful and that there was no preference for one type over the other. Some examples of these responses included, “Both - It helps build confidence in what I am currently doing
in both cases” (Teacher 17) and “They were both helpful because I was able to use both to directly improve my teaching” (Teacher 21). Teacher 18 explained that the answer to the question was dependent upon the goal of the teacher or maybe even the administrator offering feedback, “They are both helpful for different reasons. To determine what "helpful" means is to identify the desired outcome of the feedback. Is the focus to improve implementation of district initiatives or content neutral instructional strategies? Or is the focus to improve content specific instruction?” While Teacher 16 showed appreciation for both, there was still a realization of which type of feedback was most beneficial on a personal basis:

Like stated above, both are helpful--I just have to take each for what it is. I think the general teaching feedback is probably a little more helpful--I am pretty confident with my specific content knowledge, and know that the biggest thing I can improve on are moreso [sic] my general classroom strategies.

Finally, in response to the survey item in question, Teacher 12 explained,

That is difficult to answer. Both are important for completely different reasons. If I am ineffective in how I evaluate the level of understanding with my students, I can easily move on to a more in depth part of the lesson without the students having the appropriate background. At that point, it doesn't matter how wonderful the lesson is, the students are not going to be in a position to effectively learn, and will most likely "shut down." It would be easy to think the specific "science feedback" is more important, but the bottom line is that "good teaching" will nearly always outweigh a "good understanding” of the curriculum.
There were no responses that indicated any of the 26 participating science teachers believed that solely content-specific administrative feedback would be most helpful for professional growth.

**Sub-Research Question 3 (SRQ3)**

SRQ3: How (qualitative) and to what degree (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-neutral feedback?

**Qualitative Data**

Secondary science teachers were asked how they would respond to receiving content-neutral feedback from an administrator (TEES-F item 24), which helps to gauge teacher perceptions of administrator capacity in a content-neutral setting. Of the 20 science teachers who answered this question, 15 were receptive to receiving content-neutral feedback, two were sometimes willing to listen, and three were non-receptive to the feedback. These numbers in themselves are an indication that 85% (17/20) of the participating science teachers view administrators as capable of offering content-neutral feedback at least part of the time. One of the non-receptive teachers, Teacher 24, shared, “I [sic] don’t like it, I [sic] feel that they don’t know what they are doing.” Teacher 8 felt receptive to content-neutral feedback sometimes, stating “a [sic] observer who has limited content knowledge is probably seeing things from student perspective.” Being privy to a perspective similar to that of a student might help the science teacher focus on how to make better connections and meet the students where they are. Fifteen science teachers were open to feedback from administrators, with several indicating that they would always be open to receiving feedback and would try to utilize it in their
classrooms. As Teacher 23 shared, “it is usually beneficial, but don’t [sic] always apply to Science.” Related to this idea, Teacher 16 elaborated,

I respond to it by being open minded, and knowing that there are always a multitude of strategies that reach all students, even the ones who might normally be a tough case. I think about how I can take that feedback, put my own spin on it, and turn it into a successful strategy in my classroom--and give it a shot.

Teacher 18 responded by supporting many of the statements that had previously been made by administrators concerning content-specific feedback from a non-specialist, with

I appreciate content neutral feedback because I do not expect my admin to be a content specialist, nor would I want content specific feedback from someone who wasn't a content specialist. Effective instruction is effective instruction. Content specific feedback many times is still dependent upon structuring engaging lessons, making quick transitions and unpacking/sense making components of activities. These strategies are not specific to science.

Science teachers’ responses to additional open-ended survey questions also addressed the answer to this sub-research question, namely TEES-F items 22a, 22b, 23d, and 27. TEES-F item 22 asked whether science teacher participants had experienced working with an administrative evaluator who was formerly a science teacher, and then followed up with 22a that asked how teachers thought that influenced the feedback they received. TEES-F item 22b concluded the line of questioning by asking science teachers how their administrator’s area of content expertise impacted science teacher interest in the feedback offered. Of the science teacher participants who did not have an administrator with a science background, responses indicated that the feedback offered
was more general in nature. However, this did not seem to limit science teacher interest in the content-neutral feedback offered. Teacher 16 responded to TEES-F item 22a concerning the influence that content has in administrator feedback with “I think it just makes it much more general. A former English teacher can still evaluate my ability to reach kids through general teaching methods, it just won't focus as much on my ability to relate content to kids and connect ideas within our curriculum.” This comment was followed by “I am still very interested, I just know to expect more non-content specific ideas that are centered on pedagogy and effective teaching strategies” (Teacher 16) in response to TEES-F item 22b. Similarly, Teacher 23 felt that “there are certain things that make all teachers great so they were able to comment on those aspects, but not about teaching science in general” followed by “I’m always open for feedback no matter the source.” These responses indicate that science teachers view their administrator’s capacity to provide content-neutral feedback in a positive manner. Teacher 12 summarized his/her view of administrator content experience in the following way,

Good teaching strategies transcend specific curriculum issues, so if the administrator is well skilled and effective in communicating those strategies in their feedback, then having a specific background in science is not important. Being able to empathize with the science teacher is important, but I don't believe that it is a necessity.

TEES-F item 23 included a line of questioning concerning what feedback from administrators typically focused on, and then asked science teachers to give specific examples of what content-neutral and content-specific feedback might look like and how they differed from each other. The part of TEES-F item 23 that pertains to SRQ3 is how
science teachers responded when they were asked what type of feedback was more helpful to them and why. One science teacher indicated that administrators were incapable of providing helpful feedback on either a content-neutral or a content-specific basis. However, 19 of 20 (95%) secondary science teachers felt the feedback they received on a content-neutral basis was helpful, which would be an indication of a perceived capacity of administrators to provide content-neutral feedback.

Finally, secondary science teacher responses to TEES-F item 27 provided some insight to the question of whether administrators were viewed by science teachers as capable of providing content-neutral feedback. Of the eight science teachers that responded in TEES-F item 26 that they needed some sort of content-neutral feedback support to grow as a professional, six (75%) felt that their administrator could meet those needs, which is an indication of administrator capacity in a content-neutral setting. Teacher 16 shared, “Yes--maybe not as scientifically specific on some components, but all of our administrators are capable of evaluating the flow of a classroom and seeing how well students are handling activities, materials, and assessments.” Comparatively, when secondary administrators were asked similar questions in ASES-S items 22 and 22a about what type of feedback they felt would help science teachers grow professionally and whether they felt like they could provide that feedback, the four administrators who pinpointed content-neutral supports as necessary also felt like they could provide that support to science teachers. In this regard, both secondary science teachers and administrators view administrators in a positive capacity when it comes to providing content-neutral feedback.
Quantitative Data

SRQ3 also incorporated a quantitative component into the question, namely to what degree do secondary science teachers view administrative capacity to provide content-neutral feedback. Descriptive statistics, including mean, mode, and standard deviation, were calculated to examine this question. Likert scores for eight TEES-F survey items were examined both individually and combined to explore an answer to this research question. Descriptive statistics for individual survey items from 26 secondary science teacher participants can be seen in Table 5. An additional column was added to see what percentage of participants responded with 4s or 5s on their Likert scales, indicating that respondents either agreed or strongly agreed with the survey item.

Table 5.

Content-neutral feedback perceptions of secondary science teachers

<table>
<thead>
<tr>
<th>TEES-F survey item</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
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<tbody>
<tr>
<td>5. Evaluation feedback helped improve general instructional effectiveness.</td>
<td>3.36</td>
<td>4</td>
<td>0.860</td>
<td>48</td>
</tr>
<tr>
<td>7. Evaluation feedback was aligned with pedagogy.</td>
<td>3.42</td>
<td>4</td>
<td>0.902</td>
<td>50</td>
</tr>
<tr>
<td>10. Evaluator appeared competent to evaluate content-neutral teaching performance.</td>
<td>3.62</td>
<td>4</td>
<td>1.023</td>
<td>61.54</td>
</tr>
<tr>
<td>11. Evaluator was able to offer effective content-neutral teaching strategies.</td>
<td>3.50</td>
<td>4</td>
<td>0.949</td>
<td>65.38</td>
</tr>
<tr>
<td>14a. Content-neutral feedback was received from a non-content expert administrator.</td>
<td>3.52</td>
<td>4</td>
<td>1.262</td>
<td>64.0</td>
</tr>
<tr>
<td>14b. Feedback was incorporated into teaching.</td>
<td>3.23</td>
<td>4</td>
<td>1.032</td>
<td>46.15</td>
</tr>
<tr>
<td>16a. Content-neutral feedback was received from a content expert administrator.</td>
<td>2.96</td>
<td>4</td>
<td>1.216</td>
<td>46.15</td>
</tr>
<tr>
<td>16b. Feedback was incorporated into teaching.</td>
<td>3.00</td>
<td>3</td>
<td>1.131</td>
<td>38.46</td>
</tr>
</tbody>
</table>
The descriptive statistics per TEES-F item seen in Table 5 show a neutral-to-positive view of administrator capacity to provide content-neutral feedback in a secondary science classroom. The means range from 2.96 to 3.62 with modes at 4, with one exception of 3 as a mode for TEES-F 16b. The standard deviations ranged from 0.860 to 1.262, with Likert answers ranging from 1 to 5 for each survey item. When examining each item individually by the percentage of 4s and 5s found in the data table, participants scored administrators highest on appearing competent to evaluate content-neutral teaching performance, offering effective content-neutral teaching strategies, and offering content-neutral feedback in general, with percentages at 61.54, 65.38, and 64.0, respectively. Table 6 shows a combination of the eight items shown separated in Table 5 to gain a composite view of what science teacher perceptions of administrator capacity for content-neutral feedback looks like. Similar to values seen in Table 5, the mean is 3.33 and the mode at 4, with an indication that teachers view administrator capacity for content-neutral feedback in a positive way.

Table 6.

*Composite statistics for content-neutral feedback perceptions of science teachers*

<table>
<thead>
<tr>
<th>Composite of TEES-F questions 5, 7, 10, 11, 14a, 14b, 16a, 16b</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.33</td>
<td>4</td>
<td>1.062</td>
</tr>
</tbody>
</table>

When examining both qualitative and quantitative data concerning science teacher perceptions of administrator capacity to provide content-neutral feedback, it would seem that they corroborate each other with a fairly positive view of feedback offered in this context. There are some science teachers who have not had good experiences with content-neutral feedback, but many others who have either had good experiences or
encompass a growth mindset when it comes to receiving any type of feedback from administrators.

**Sub-Research Question 4 (SRQ4)**

SRQ4: How (qualitative) and to what degree (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive administrator capacity to provide content-specific feedback?

**Qualitative Data**

TEES-F 25 asked secondary science teachers how they would respond to receiving content-specific feedback from administrators, and 19 participants replied. Six science teachers responded with a variety of answers that were not indicative of interest in content-specific feedback offered by administrators. Some of these explanations included, “I’d be surprised because usually the admin [sic] team has very little Chemistry knowledge” (Teacher 1), “It would be pretty useless if they have not taught science in the past” (Teacher 23), and “I would respond to it best if I were observed by teaching peers” (Teacher 9). This last statement tells me that Teacher 9 is interested in feedback that is connected to content, but would prefer for that feedback to come from a colleague than an administrator. Two science teachers replied that their response to content-specific feedback from an administrator would “depend on a great number of variables” (Teacher 15), including “the knowledge level, teaching experience, and understanding of curriculum the individual has” (Teacher 25). Teacher 4’s response of “No preference” was confusing to me and so I referred back to previous responses to see if they helped to explain this singular answer. Teacher 4 was “not receptive” to content-neutral feedback,
explained that no feedback was needed to grow as a science teacher, and generally did not put much stock in teacher evaluation or developing professionally.

The remaining 13 (68.4%) science teacher participants responded that they would be receptive to receiving content-specific feedback. Five of the 13, however, replied in almost the same way when asked if they would be receptive to content-neutral and content-specific feedback. These responses showed an open mind to new ideas and potential growth, but not necessarily a preference for content-specific feedback from administration. For example, Teacher 12 replied that they would respond to feedback that is content-specific in “the exact same way. I will make adjustments to any lesson that I receive pointed and research based feedback on that can enhance the student learning. If the feedback won't directly improve student learning/understanding, I most likely will disregard it.” The remaining eight science teachers showed an interest in receiving content-specific feedback in preference to content-neutral, with comments such as, “I would love it, I feel that it would be more useful for my lessons” (Teacher 20) and “That would be great; can allow me to change my perspectives on my units” (Teacher 10).

Some of the teachers who elaborated more on their answer included some details in their reasoning for preferring content-specific feedback that is worth sharing. For example, Teacher 18 replied, “I would appreciate content specific feedback, but my experience working with teachers in PD settings is that there must be a relationship with the person providing the feedback and the individual providing feedback must be viewed as an expert or having additional information that will support my growth.” This makes sense because even if an administrator has content experience, that individual might not be viewed as a content expert. I came across one example of this with Teacher 19 who said
his/her administrator was formerly a science teacher, but had not been in the classroom for a long time, and therefore was not viewed in much capacity. Teacher 16 shared,

With content specific feedback, I usually think about the background of the evaluator and try to think of how they would have used it--it might spark a conversation during our PLC time about doing something in class or a lab differently, and we usually find a way to connect it best to our classroom objectives and at least try it.

Finally, Teacher 22 responded,

It is very helpful to have an administrator that is familiar with the curriculum and state standards. I think teaching strategies of what works and is not as effective would be shared more with content-specific feedback. They also understand the need to fund a successful science curriculum. (equipment, lab supplies, science storage) [sic].

Responses to TEES-F item 25 about how teachers would respond to content-specific feedback were compared to item 24 in which science teachers explained how they would respond to content-neutral feedback. In contrast with item 25 in which 68.4% of science teachers would be open to receiving content-specific feedback from administrators, 85% of science teachers were interested in content-neutral feedback from administrators. For the most part, it was found that secondary science teachers were fairly open to feedback of either nature, who then would do with it what was necessary for improvement in the classroom. There were only a couple of responses that were different from each other. For example, in response to receiving content-neutral feedback, Teacher 24 replied, “i [sic] don’t like it, i [sic] feel that they don’t know what they are doing” and
then replied in a more positive manner when discussing the receipt of content-specific feedback, with “i [sic] can use that feedback and make changes to my activity.” Teacher 5 had a similar response, with a reply of “I would probably ignore it mostly” in response to receiving content-neutral feedback to replying that they would receive content-specific feedback “more favorably.”

Science teacher responses to additional open-ended survey questions also addressed the answer to this sub-research question, namely TEES-F items 22a, 22b, 23d, and 27. As outlined previously, TEES-F item 22 focused on whether the evaluators had prior experience as science teachers, and then asked how this influenced both the type of feedback offered and what science teacher interest is in receiving content-specific feedback. Science teacher responses to this line of questioning shared that content-specific feedback was welcomed and appreciated from administrators with science backgrounds, but the capacity of administrators without science backgrounds to offer purposeful content-specific feedback was brought into question. For example, Teacher 13, who has had one of 10 previous evaluators with science expertise, shared “They don't seem to understand the challenges we face teaching the content. They are often not deemed competent to evaluate.” Teacher 15 replied, “I feel that most administrators have no idea what it takes to do my job,” while Teacher 23 explained, “There are certain things that make all teachers great so they were able to comment on those aspects, but not about teaching science in general.” Teacher 23 followed this comment with, “I’m always open for feedback no matter the source.” Another science teacher responded that the feedback “is always good” (Teacher 3).
The TEES-F item 23 questioning chain asked science teachers to share what type of feedback they normally receive, how content-neutral feedback differed from content-specific feedback, and which type of feedback science teachers deemed as more helpful and why. One science teacher indicated that administrators were incapable of providing helpful feedback on either a content-neutral or a content-specific basis. However, 16 of 20 (80%) secondary science teachers felt the feedback they received on a content-specific basis was helpful, which would be an indication of a perceived capacity of administrators to provide content-specific feedback.

TEES-F item 26 asked science teachers to share feedback needs for professional growth and item 27 focused on whether they felt their administrator could provide that necessary feedback. Of the nine science teachers who shared needs for content-specific supports in terms of feedback, three felt their evaluating administrators could provide such necessary feedback. One participant responded that they needed more feedback on “what helps the kids learn and explore more, and [sic] ideas for tough units to make it easier to help the [sic] understand” and then when questioned about whether his/her evaluator could provide such feedback, replied “If they are in my content area, yes. If not it would be difficult” (Teacher 10). Teacher 12 explained that

At this point, I feel my pedagogical skills are strong. I would always appreciate feedback on more advanced topics and if the administrator felt there were other labs or methods of instruction worth trying to improve the learning. I am not overly concerned about this, however, because it is only a rare minority of the students who struggle with my lessons in those classes.
When questioned on administrator abilities to provide this information, Teacher 12 replied with, “Doubtfully. I do not think we have an administrator with an advanced science degree, or someone who has taught science beyond the general level (bio and phy sci) [sic].” The remaining science teacher participants who stated that they needed science specific supports in the classroom also felt their evaluating administrator could not provide such supports, which would be indicative of a perception of lower capacity for administrators in providing content-specific feedback for professional growth as compared to that of content-neutral feedback.

A comparison of science teacher perspectives to those of administrators from ASES-S items 22 and 22a, which focus similarly on administrator perceptions of the professional growth needs of secondary science teachers and whether or not they believe they can personally provide the necessary feedback, was conducted. Six of 10 administrators who participated in the survey questions felt that science teachers needed some sort of content-specific science supports, and three (50%) felt they could provide the necessary feedback. Two of these three participants had no prior teaching experience in the science classroom. As an example, Administrator 6, with content specialization in Physical Education, shared that science teachers needed feedback on “how to better engage in scientific learning rather than content memorization and regurgitation” and when questioned on whether he could provide that feedback, replied “Yes, by asking science teachers to show how they are engaging students in scientific learning activities and providing evidence of student learning and evidence of student application of scientific processes.” Three of the administrators who felt science teachers needed more content-specific feedback for professional growth did not feel capable of providing that
feedback on their own. Administrator 12 explained that they could provide “some. Best if peers and coaches are also involved.” The other two administrators explained that they could not provide the necessary content-specific feedback with comments like “no, I cannot; I do not have a science background” (Administrator 10) and “Not as well as a science expert (Administrator 11). In addition, Administrator 3 shared views of content-neutral needs for science teacher feedback, but then shared “I can attempt to provide comparison between the teacher areas. However, science is an area I understand I need to improve on as a [sic] instructional leader.” Comparisons between TEES-F and ASES-S for SRQ4 show that both science teachers and administrators view administrator capacity for providing content-specific feedback in a secondary science classroom at a lower level than that of content-neutral feedback capacities.

**Quantitative Data**

SRQ4 contained a quantitative focus to examine the degree to which secondary science teachers perceived administrator capacity to provide content-specific feedback. Eight TEES-F items addressed this research question, with Likert-scaled answers examined using descriptive statistics of mean, mode, and standard deviation. Table 7 shows the results of these descriptive statistics as separated per survey item. There is also a column showing percentages of science teachers who answered with either a 4 or 5 for each individual question. Responses of 4s and 5s corresponded with “Agree” and “Strongly Agree” on the Likert scale, respectively. The purpose of this column was simply to give another view of science teacher perspective distributions with a positive focus.
Table 7.

*Content-specific feedback perceptions of secondary science teachers*

<table>
<thead>
<tr>
<th>TEES-F survey question</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Evaluation feedback helped improve content-specific instructional effectiveness.</td>
<td>3.04</td>
<td>3</td>
<td>1.039</td>
<td>34.62</td>
</tr>
<tr>
<td>8. Evaluation feedback was aligned with course taught.</td>
<td>3.35</td>
<td>4</td>
<td>0.846</td>
<td>46.15</td>
</tr>
<tr>
<td>12. Evaluator appeared competent to evaluate content-specific teaching performance.</td>
<td>3.15</td>
<td>3</td>
<td>1.047</td>
<td>38.46</td>
</tr>
<tr>
<td>13. Evaluator was able to offer effective content-specific teaching strategies.</td>
<td>3.08</td>
<td>3</td>
<td>1.018</td>
<td>33.33</td>
</tr>
<tr>
<td>15 a. Content-specific feedback was received from a non-content expert administrator.</td>
<td>2.85</td>
<td>3</td>
<td>1.120</td>
<td>30.77</td>
</tr>
<tr>
<td>15 b. Feedback was incorporated into teaching.</td>
<td>2.84</td>
<td>3</td>
<td>1.028</td>
<td>24.00</td>
</tr>
<tr>
<td>17 a. Content-specific feedback was received from a content expert administrator.</td>
<td>2.81</td>
<td>3</td>
<td>1.167</td>
<td>26.92</td>
</tr>
<tr>
<td>17 b. Feedback was incorporated into teaching.</td>
<td>2.85</td>
<td>3</td>
<td>1.084</td>
<td>26.92</td>
</tr>
</tbody>
</table>

Individual survey items pertaining to SRQ4 had means ranging from 2.81 to 3.35, modes of 3 with the exception of TEES-F item 8 which had a mode of 4, and standard deviations that ranged from 0.846 to 1.167. The Likert responses ranged from 1-5 for each item except for 15b that only included 1-4 as responses, and percentages of 4s or 5s ranged from 24% to 46.15%. Composite descriptive statistics were calculated for all eight items using the raw Likert numbers for each item and not the averages of the descriptive statistics for each item. Table 8 shows these composite statistics, with an overall mean of 3 (Neutral), mode of 3 (Neutral), and standard deviation of 1.046.
Table 8.

Composite statistics for content-specific feedback perceptions of science teachers

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite of TEES-F questions 6, 8, 12, 13, 15a, 15b, 17a, 17b</td>
<td>3.00</td>
<td>3</td>
<td>1.046</td>
</tr>
</tbody>
</table>

These quantitative results correspond with the responses received from the open-ended qualitative portion of the TEES-F survey. In general, there were some secondary science teachers who had complete confidence in their administrators in terms of offering content-specific feedback, and other science teachers who did not feel their administrators were capable of such feedback. This idea was paralleled in administrator responses to similar items from the ASES-S survey. To test whether science teacher perceptions of administrator capacity were different between content-neutral and content-specific feedback, a t-test was conducted between the quantitative results of SRQ3 and SRQ4. The t-test was 1-tailed because the expectation was that content-specific perceptions would be lower than those of content-neutral perceptions. Additionally, it was a paired test because the same science teachers answered SRQ3-related questions as SRQ4-related questions. A t-test was deemed possible regardless of the non-parametric data collected because of the large standard deviations found across the board. The outcome of this t-test can be seen in Table 9.

Table 9.

Content-neutral versus content-specific feedback perceptions

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRQ3 vs. SRQ4</td>
<td>1</td>
<td>paired</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01. Statistics based on TEES-F questions 5-8, 10-17.
The resulting t-test comparing quantitative responses from SRQ3 and SRQ4 show a significant result of \( p = 7.613 \times 10^{-09} \), which is significant at the \( p < 0.01 \) level. This result indicates that perceived administrator capacity to deliver content-specific feedback is significantly lower than perceived administrator capacity to deliver content-neutral feedback. This quantitative result is corroborated by qualitative responses that were received as well.

**Sub-Research Question 5 (SRQ5)**

SRQ5: How (qualitative) and to what extent (quantitative), as demonstrated through TEES-F completion, do secondary science teachers perceive their satisfaction with feedback offered through teacher evaluation?

**Qualitative Data**

TEES-F items 21 and 21a asked secondary science teachers if the evaluation and/or feedback process made them better teachers and then asked them to elaborate. Six of the 25 participants (24%) shared that the evaluation and/or feedback process did not make them better teachers, while four (16%) claimed limited impact. The remaining 15 (60%) responding science teachers felt the evaluation/feedback process was purposeful in making them better classroom teachers. Of the six negative responses, five teachers shared that they had received no meaningful feedback and that the evaluation process was simply a box on a checklist of competency in the classroom. Teacher 2 shared, “I am not sure that the evaluation model within our district is take [sic] seriously by the evaluators….very busy, possibly just jumping through the hoops,” while Teacher 10 explained, “Most of mine has been rated; not much feedback or guidance” and followed up with “Just seeing if you are Competent or not. No further direction.” Teacher 23
shared, “I don't think I have been observed enough to get good enough feedback to influence my teaching.” In light of teacher evaluation used solely as an accountability measure, Teacher 19 responded, “I feel I'm the expert at what I do and how I do it. My own motivation to be the best teacher is internal motivation not external from an administrator.”

Science teachers who commented on feedback and teacher evaluation as having limited impact on their classroom performance focused on the idea that the feedback is generally content-neutral in nature and might be better received coming from a science colleague or at least an administrator with content experience. Teacher 5 commented, “Another set of eyes helps…. I videotaped myself and watch that….. This helps me more.” Teacher 9 shared that the feedback and evaluation process is only sometimes helpful, elaborating that

I would much rather that the administrator comes by my room on a weekly basis, pops in to see what we are doing and keeps track of the different aspects that they see. Teaching is not an everything all at once deal it is an art. It would also be great to have administration visible to students.

Of the 15 science teacher participants who felt the process of teacher evaluation and feedback received were purposeful in making them better teachers, the resulting themes were that administrative feedback was helpful in highlighting strengths and areas for improvement, as well as offering a different perspective and opportunity for reflection concerning content delivery and strategies utilized in the classroom. Teacher 26 responded, “Yes it helps to show what areas can be addressed, while also allowing to gain knowledge from another source about teaching strategies,” while Teacher 18
commented that “the evaluation process holds me accountable to continuing to think about why I do what I do and asking the question of if I am communicating that process with my students.” Teacher 22 elaborated and shared that “feedback regarding my teaching ability always has me reflect on the practices that I use and how I can do my job better.” Finally, Teacher 16 shared feelings on the impact of the feedback and evaluation process, “It absolutely makes me a better teacher--it keeps me aware of my ability to reach all students and focus on details that are easy for a busy teacher to forget. It creates a sense of accountability and gives me materials/ideas/methods to focus and improve on.”

The collective responses to this survey item would indicate that 60% of participating science teachers felt the process of evaluation and offering of feedback was impactful in the classroom setting.

TEES-F item 27 asked science teachers if their administrative evaluators could provide them with the feedback they needed to grow professionally. Seven of 20 (35%) participating science teachers communicated that their administrators could provide the feedback needed for professional growth, thus indicating a satisfaction for these science teachers in having their needs met by their evaluating administrators. One of the 20 (5%) science teachers responded “sometimes” (Teacher 5), and 12 of 20 (60%) participants stated that their evaluating administrator could not meet their needs in providing the feedback needed to grow professionally. However, this was not always a sign of a dissatisfied science teacher, as Teacher 18 shared “No. My evaluator cannot provide that feedback. In addition, my evaluator has a very full plate of assignments and I would not expect them to be able to meet these needs. Rather, they could be met from a department setting, Science Instructional Coach, Curriculum Coordinator or ESU support staff.”
Teacher 18 was the only participant who answered that his/her administrator could not provide the necessary feedback and that it was not expected of them to do so. The remaining 11 science teachers simply stated that their administrator could not meet their needs in terms of providing feedback necessary for professional growth.

This survey item is contradictory to that of TEES-F items 21 and 21a in that 60% of participating teachers stated that their evaluating administrator could not provide the necessary feedback for professional growth in the secondary science classroom. When comparing participant responses between TEES-F items 21 and 27, it was found that the 13 teachers who responded that their evaluating administrators were either unable to or only sometimes able to provide the necessary feedback for professional growth (TEES-F item 27) had varying responses to whether the evaluation and/or feedback process made them better teachers (TEES-F item 21). There were four science teachers whose responses agreed in that they did not believe the feedback process made them better teachers or that their evaluating administrator could provide the necessary feedback to produce such growth. Teacher 5, who stated that his/her administrator could sometimes provide necessary growth feedback corresponded to one of the four participants who said the feedback process sometimes made them better teachers. The remaining three teachers who replied that the evaluation and/or feedback process sometimes made them better teachers, also responded that their administrators could not provide them with the necessary growth feedback. Interestingly enough, there were five science teachers who responded that the evaluation and/or feedback process was successful in making them better teachers; however, they also shared that their evaluating administrator could not provide them with the feedback necessary to grow as a science teacher. Perhaps this can
be interpreted in a manner that any feedback received from administrators is purposeful in improving their classroom teaching, but does not necessarily help them grow as a teacher in their particular science content area. It is possible to become a better, more pedagogically-sound teacher and still be missing the content strategies and skills.

**Quantitative Data**

SRQ5 was also addressed with quantitative data collected from TEES-F Likert-scaled survey items. Descriptive statistics for individual survey items can be seen in Table 10. This table included means, modes, and standard deviations for 14 different survey items, in addition to a column examining the percentages of 4s and 5s stemming from responses to each survey item.

Table 10.

*Secondary science teacher perceptions of feedback satisfaction.*

<table>
<thead>
<tr>
<th>TEES-F survey question</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Evaluation feedback was useful.</td>
<td>3.54</td>
<td>4</td>
<td>0.905</td>
<td>61.54</td>
</tr>
<tr>
<td>3. Evaluation feedback was specific.</td>
<td>3.62</td>
<td>4</td>
<td>0.898</td>
<td>61.54</td>
</tr>
<tr>
<td>4. Evaluation feedback suggested specific changes.</td>
<td>3.32</td>
<td>4</td>
<td>0.900</td>
<td>48.00</td>
</tr>
<tr>
<td>5. Evaluation feedback helped improve general instructional effectiveness.</td>
<td>3.36</td>
<td>4</td>
<td>0.860</td>
<td>48.00</td>
</tr>
<tr>
<td>6. Evaluation feedback helped improve content-specific instructional effectiveness.</td>
<td>3.04</td>
<td>3</td>
<td>1.039</td>
<td>34.62</td>
</tr>
<tr>
<td>9. Evaluation feedback provided information for PD opportunities.</td>
<td>2.50</td>
<td>3</td>
<td>1.068</td>
<td>15.38</td>
</tr>
<tr>
<td>14 b. Feedback was incorporated into teaching.</td>
<td>3.23</td>
<td>4</td>
<td>1.032</td>
<td>46.15</td>
</tr>
<tr>
<td>15 b. Feedback was incorporated into teaching.</td>
<td>2.84</td>
<td>3</td>
<td>1.028</td>
<td>24.00</td>
</tr>
<tr>
<td>16 b. Feedback was incorporated into teaching.</td>
<td>3.00</td>
<td>3</td>
<td>1.131</td>
<td>38.46</td>
</tr>
<tr>
<td>17 b. Feedback was incorporated into teaching.</td>
<td>2.85</td>
<td>3</td>
<td>1.084</td>
<td>26.92</td>
</tr>
<tr>
<td>18. Feedback process increased teacher(s) motivation to change classroom practice.</td>
<td>3.12</td>
<td>3</td>
<td>1.054</td>
<td>40.00</td>
</tr>
</tbody>
</table>
19. Teacher evaluation system provided PD opportunities that motivated teacher(s) to change classroom practice(s).

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.81</td>
<td>3</td>
<td>1.021</td>
<td>30.77</td>
</tr>
</tbody>
</table>

20. Satisfied with the evaluation feedback.

<p>| | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.31</td>
<td>4</td>
<td>1.011</td>
<td>57.69</td>
</tr>
</tbody>
</table>

As seen in Table 10, feedback satisfaction means ranged from 2.50 to 3.62, while modes of 3 and 4 were observed. The standard deviations ranged from 0.860 to 1.131, and percentages of 4s and 5s fluctuated from 15.38% to 61.54%. TEES-F item 9, which asked science teacher participants whether evaluation feedback provided information for professional development opportunities, resulted in the lowest percentage of 4s and 5s at 15.38%. These low percentages are concerning because they are indicators of a lower probability for satisfaction with the feedback process per science teacher perspective.

TEES-F item 19, focused on providing professional development opportunities that motivated teachers to change classroom practices, was also low in this column, with only 30.77% of 4s and 5s as answers. Two additional items with low percentages of 4s and 5s involved TEES-F items 15b and 17b, both of which were connected to survey items concerning whether certain types of feedback from administrators with specified classroom experience were incorporated into the participant’s teaching practices, and thus an indication of feedback satisfaction. For example, participant answers to TEES-F item 15b (24% of 4s and 5s) concerning content-specific feedback from a non-content expert (non-science) was lower than that of TEES-F item 14b (46.15%) that examined content-neutral feedback from a non-science administrator. Therefore, science teacher participants incorporated feedback into their teaching more often if it came in the form of content-neutral feedback from a non-content expert and least if the feedback was content-specific in nature from a non-content expert. Science teachers also showed a preference for content-neutral feedback from a content-expert (science) administrator than content-
specific feedback from content-expert administrators, with percentages of 38.46 and 26.92, respectively. Interestingly enough, percentages were similar between receiving content-specific feedback from a non-content expert (24%) and a content expert (26.92%), which may be an indication that science teacher participants were more open to the idea of receiving content-neutral feedback than content-specific feedback regardless of the expertise of the evaluating administrator. When these ideas were explored with measures of significance (see Table 11), comparisons of non-experts to experts in regards to the incorporation of feedback into teaching was not significant. However, when examining this idea with regards to content-neutral (CN) or content-specific (CS) feedback, there was a significant result indicating that content-neutral feedback was incorporated into the teaching significantly more than content-specific feedback, regardless of content specialization of the evaluating administrator.

Table 11.

*Feedback incorporation into secondary science classrooms*

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-experts vs. Experts</td>
<td>1</td>
<td>paired</td>
<td>0.130</td>
</tr>
<tr>
<td>CN vs. CS</td>
<td>1</td>
<td>paired</td>
<td>0.006**</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01.

Composite statistics were also calculated for the 13 TEES-F items contributing to the examination of SRQ5 concerning science teacher satisfaction with the evaluation and/or feedback process. Individual Likert-scaled answers were examined for all TEES-F items identified. Descriptive statistics for the composite of these items can be seen in Table 12, including the mean, mode, and standard deviation.
Table 12.

*Composite statistics of feedback satisfaction in secondary science teachers*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite of TEES-F questions 2-6, 9, 14b, 15b, 16b, 17b, 18-20</td>
<td>3.14</td>
<td>4</td>
<td>1.033</td>
</tr>
</tbody>
</table>

SRQ5 was a tough research sub-question on which to find consensus when responses were broken down in more detail. When teachers answered TEES-F item 20 concerning their overall satisfaction with teacher evaluation and feedback received, 57.69% answered with a 4 or 5 on the Likert-scale, which is a specific and direct indication of satisfaction. However, when examining Table 10, it is evident that not all aspects examined for science teacher satisfaction are perceived at the same satisfaction level. In this regard, quantitative data agrees with that of qualitative in that secondary science teachers are somewhat split on their satisfaction levels with teacher evaluation and the receipt of feedback from evaluating administrators.

**Sub-Research Question 6 (SRQ6)**

SRQ6: How (qualitative) and to what degree (quantitative), as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-neutral feedback to science teachers?

**Qualitative Data**

ASES-S item 22 asked administrator participants to share what type of feedback they thought science teachers needed to grow professionally. Item 22a followed that question up with asking whether the administrator could provide that feedback or not. Eight of the 12 participating administrators who answered these two questions replied with types of content-neutral and content-specific feedback that could be provided, with
two additional administrators responding with comments unrelated to either content-neutral or content-specific feedback. Administrator 9 shared that science teachers needed feedback in the way of “more examples in college courses that can lead to practical application” and felt they could “connect teachers with those that are leaders in the building and excel at this.” Administrator 1 felt “the best feedback is to hear from the most recent set of graduates who are studying in a science-related field in college. Then, at the top end, those students who are now involved in graduate-level work (including in the health professions).” When asked if they could provide that feedback, Administrator 1 replied that they could offer “a snapshot but not first-hand feedback.”

Of the eight administrators who mentioned feedback that could fall under the classification of content-neutral and/or content-specific needs, seven administrators replied with examples of content-specific feedback necessary for teacher growth and will be discussed in SRQ7 results. Three responses incorporated ideas of secondary science teachers needing content-neutral feedback to grow professionally and will be discussed here. The content-neutral feedback areas that administrators believed would help science teachers grow were focused on instructional models, understanding lesson plan components including learning targets, differentiated instruction, and assessment, building student-teacher relationships, engaging students in the classroom, and learning how to meet kids where they are (Administrators 2, 3, and 8). Administrators 2 and 8 will also be discussed in SRQ7 as their feedback comments mentioned content-specific components as well. In terms of administrator perceptions of their own abilities to provide content-neutral feedback to secondary science teachers as is the focus of SRQ6,
Administrator 8 felt he could provide the necessary feedback because he had “been in these classrooms as a teacher and as an administrator.” Administrator 2 explained,

As mentioned previously, I feel that my background in seeing multiple classroom instructional strategies that work provide me an opportunity to give effective feedback. Good teaching is good teaching regardless of the discipline. While the content is different from classroom to classroom, there are overarching principles that will work in any classroom.

Administrator 3 shared, “I can attempt to provide comparison between the teacher areas. However, science is an area I understand I need to improve on as a [sic] instructional leader.” As seen from these comments, all administrators listing content-neutral feedback as a teacher’s need felt adequate and capable of providing such feedback, thus indicating a high self-efficacy with content-neutral instructional leadership.

**Quantitative Data**

The quantitative portion of SRQ6 asks to what degree do secondary administrators perceive their ability to provide content-neutral feedback to the science teachers they are evaluating. To answer this research question, ASES-S items 1-9 were examined using descriptive statistics of mean, mode, and standard deviation. These nine Likert-scaled items focused on general instructional leadership roles of administrators related to the provision of feedback. An additional column was added of the percentage of 4 and 5 responses that corresponded to an answer of agree or strongly agree, both of which would be indications of high self-efficacy with regards to the survey item. Table 13 displays the descriptive statistics from these survey items.
Table 13.

*Administrator self-efficacy with content-neutral instructional leadership*

<table>
<thead>
<tr>
<th>ASES-S survey question</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am able to regularly perform effective observations of teachers.</td>
<td>4.42</td>
<td>5</td>
<td>0.669</td>
<td>91.67</td>
</tr>
<tr>
<td>2. I am able to stay abreast of current best practices for facilitating effective teaching and learning.</td>
<td>4.33</td>
<td>4</td>
<td>0.651</td>
<td>91.67</td>
</tr>
<tr>
<td>3. I am able to provide experiences that foster and facilitate high levels of teacher motivation towards teaching and learning.</td>
<td>4.00</td>
<td>4</td>
<td>0.739</td>
<td>75.00</td>
</tr>
<tr>
<td>4. I am able to provide feedback regarding effective teaching and learning practices.</td>
<td>4.42</td>
<td>4</td>
<td>0.515</td>
<td>100.0</td>
</tr>
<tr>
<td>5. I am able to engage in rich conversations with teachers following instructional observations.</td>
<td>4.17</td>
<td>5</td>
<td>0.937</td>
<td>83.33</td>
</tr>
<tr>
<td>6. I am able to lead observation debriefing conversations with teachers on how students learn.</td>
<td>4.17</td>
<td>5</td>
<td>0.937</td>
<td>83.33</td>
</tr>
<tr>
<td>7. I am able to encourage teachers to reflect upon their knowledge, skills, and dispositions regarding effective teaching and learning.</td>
<td>4.25</td>
<td>4</td>
<td>0.622</td>
<td>91.67</td>
</tr>
<tr>
<td>8. I am able to recognize errors or misconceptions within a teacher’s instruction.</td>
<td>4.00</td>
<td>4</td>
<td>0.426</td>
<td>91.67</td>
</tr>
<tr>
<td>9. I am able to discuss the rationale behind curriculum and instruction reform.</td>
<td>3.92</td>
<td>4</td>
<td>0.669</td>
<td>75.00</td>
</tr>
</tbody>
</table>

Likert responses ranged from 3 to 5 on seven of the nine survey items. ASES-S item 5 and 6 included response ranges from 2 to 5. As seen in Table 13, ASES-S means for items 1-9 ranged from 3.92 to 4.42, with modes of 4 for six items and 5 for three items. The standard deviations ranged from 0.426 to 0.937 and the percentage of 4s and 5s for each item varied from 75% to 100%. All individual responses for ASES-S items 1-9 were combined to run descriptive statistics for the composite of all items. These results can be seen in Table 14.
Table 14.

Composite statistics for content-neutral instructional leadership perceptions

<table>
<thead>
<tr>
<th>Composite of ASES-S questions 1-9</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.19</td>
<td>4</td>
<td>0.699</td>
<td>87.04</td>
</tr>
</tbody>
</table>

The composite of all content-neutral instructional leadership responses resulted in a mean of 4.19, a mode of 4, with a standard deviation of 0.699. Those values, combined with 87% of answers in the 4 or 5 range, result in an indication of high self-efficacy of administrators in providing content-neutral feedback to secondary science teachers. In addition, these quantitative results would agree with the information received during qualitative data collection. Administrators were confident in their ability to provide content-neutral feedback, as demonstrated by examination of both qualitative and quantitative data.

Sub-Research Question 7 (SRQ7)

SRQ7: How (qualitative) and to what degree (quantitative), as demonstrated through ASES-S completion, do secondary administrators perceive their ability to provide content-specific feedback to science teachers?

Qualitative Data

Before delving into what feedback administrators believed they could provide for science teachers, it made sense to first start with the examination of ASES-S item 21, which asked administrators to share ideas that came to mind when hearing the words “Effective Science Instruction.” It was deemed important to first consider what the essentials were to effective instruction in a secondary classroom before examining whether administrators could provide such feedback to teachers. Ten administrators answered this question, with the following themes arising: evidence of student learning,
student engagement and motivation, interactive, hands-on laboratory experiences, “authentic demonstrations” (Administrator 10), problem solving, and the application of science-related concepts to the real world through inquiry.

ASES-S open-ended items 22 and 22a asked administrators what type of feedback they thought science teachers needed to ensure professional growth and then followed up with the question on whether they felt they could provide that feedback. Seven administrator responses incorporated some aspect of content-specific feedback into their comments, including the need to balance lecture with hands on activities, spark interest, develop student inquiry, “…engage in scientific learning rather than content memorization and regurgitation” (Administrator 6), and make content relevant to students and applicable to real world settings (Administrators 2, 4, 6, 8). In more general terms, Administrators 10, 11, and 12 responded that science teachers would benefit best from some sort of content-specific feedback.

When questioned on whether they could provide the feedback they identified as essential for secondary science teacher growth, four of the seven administrators (57.1%) responded that they were able to provide the necessary feedback. Administrator 2 explained that, “…Good teaching is good teaching regardless of the discipline. While the content is different from classroom to classroom, there are overarching principles that will work in any classroom.” One administrator responded that he could provide some of what was needed but that both peers and instructional coaches could also assist in offering necessary feedback, and two administrators replied that they were not able to provide the needed feedback because they had no background in science. In comparison to SRQ6, administrators indicating a need for content-specific feedback to ensure science
teacher growth in the classroom were not as confident with the provision of such feedback. Three of the seven administrators indicating a need for content-related feedback did not feel like they could provide such feedback on their own.

**Quantitative Data**

SRQ7 was also explored from a quantitative aspect in examining to what degree secondary administrators perceived their ability to provide content-specific feedback to science teachers. ASES-S items 10-18 were isolated to address this research question, as they focused on science-specific instructional leadership skills related to offering feedback in a secondary science classroom. Descriptive statistics, including mean, mode, and standard deviation were calculated for each item individually. An additional calculation of the percentage of 4s and 5s resulting from Likert-scaled answers for each survey item was included as yet another view of the data. Table 15 displays these values for each item in question.

**Table 15.**

*Administrator self-efficacy with content-specific instructional leadership*

<table>
<thead>
<tr>
<th>ASES-S survey question</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. I am able to regularly perform effective observations of instruction by science teachers.</td>
<td>3.75</td>
<td>4</td>
<td>0.866</td>
<td>66.67</td>
</tr>
<tr>
<td>11. I am able to stay abreast of current best practices for facilitating effective science teaching and learning.</td>
<td>3.67</td>
<td>4</td>
<td>0.888</td>
<td>58.33</td>
</tr>
<tr>
<td>12. I am able to provide experiences that foster and facilitate high levels of teacher motivation towards the teaching and learning of science.</td>
<td>3.58</td>
<td>3</td>
<td>0.900</td>
<td>50.00</td>
</tr>
<tr>
<td>13. I am able to provide feedback using consistent language regarding effective science teaching and learning practices.</td>
<td>3.67</td>
<td>4</td>
<td>0.888</td>
<td>58.33</td>
</tr>
<tr>
<td>14. I am able to engage in rich, science-related conversations with teachers following instructional observations.</td>
<td>3.75</td>
<td>3</td>
<td>0.965</td>
<td>58.33</td>
</tr>
</tbody>
</table>
15. I am able to lead observation debriefing conversations with teachers on how students learn science. 3.75 4 0.965 58.33

16. I am able to encourage teachers to scientifically reflect upon their knowledge, skills, and dispositions regarding effective science teaching and learning. 3.75 4 0.866 66.67

17. I am able to recognize science-based errors or misconceptions within a teacher’s instruction. 3.58 3 1.165 50.00

18. I am able to discuss the rationale behind science-based curriculum and instruction reform. 3.58 4 1.084 58.33

Science-specific instructional leadership survey items showed means ranging from 3.58 to 3.75, and modes of either 3 or 4. Standard deviations ranged from 0.866 to 1.165, with percentages of 4s or 5s ranging from 50% to 66.67%. To look at these values as a composite of content-specific instructional leadership abilities as a whole, all individual Likert scores from each item were combined into the composite statistics displayed in Table 16.

Table 16.

<table>
<thead>
<tr>
<th>Composite of ASES-S questions 10-18</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.68</td>
<td>4</td>
<td>0.926</td>
<td>58.33</td>
<td></td>
</tr>
</tbody>
</table>

When compared to quantitative results from SRQ6 that focused on content-neutral instructional leadership abilities (Tables 13 and 14), the descriptive and composite statistics shown in Table 15 and 16 are lower. Paired t-tests were calculated between parallel survey items to test for a significant difference between collective administrator scores between the two items. For example, ASES-S item 1 was a content-neutral version of ASES-S item 10, which incorporated the same question with a science focus. T-tests were utilized even though the data collected was ordinal and non-parametric because the standard deviations were above 0.5 for each survey item, save one with ASES-S item 8 at
a standard deviation of 0.426. One-tailed t-tests were used because the expectation was that administrator self-efficacy would be lower for science-specific instructional leadership feedback than for that of content-neutral instructional leadership feedback. The t-tests were paired because the same administrators answered ASES-S items 1-9 as ASES-S items 1-10. Results of the nine paired t-tests can be seen in Table 17.

Table 17.

Administrator self-efficacy with content-neutral (CN) versus content-specific (CS) instructional leadership

<table>
<thead>
<tr>
<th>Comparison of CN to CS survey items</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASES-S 1 v. ASES-S 10</td>
<td>1</td>
<td>paired</td>
<td>0.0003**</td>
</tr>
<tr>
<td>ASES-S 2 v. ASES-S 11</td>
<td>1</td>
<td>paired</td>
<td>0.0064**</td>
</tr>
<tr>
<td>ASES-S 3 v. ASES-S 12</td>
<td>1</td>
<td>paired</td>
<td>0.0269*</td>
</tr>
<tr>
<td>ASES-S 4 v. ASES-S 13</td>
<td>1</td>
<td>paired</td>
<td>0.0060**</td>
</tr>
<tr>
<td>ASES-S 5 v. ASES-S 14</td>
<td>1</td>
<td>paired</td>
<td>0.0876</td>
</tr>
<tr>
<td>ASES-S 6 v. ASES-S 15</td>
<td>1</td>
<td>paired</td>
<td>0.0269*</td>
</tr>
<tr>
<td>ASES-S 7 v. ASES-S 16</td>
<td>1</td>
<td>paired</td>
<td>0.0034**</td>
</tr>
<tr>
<td>ASES-S 8 v. ASES-S 17</td>
<td>1</td>
<td>paired</td>
<td>0.1049</td>
</tr>
<tr>
<td>ASES-S 9 v. ASES-S 18</td>
<td>1</td>
<td>paired</td>
<td>0.1329</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01.

Results indicate that six of the nine t-tests show significant differences between content-neutral and content-specific instructional leadership abilities, as self-perceived by administrators. Four of the six t-tests are significant at the p < 0.01 level. Of these four tests, a generalized version of topics encompassed being able to regularly perform effective observation of instruction (ASES-S items 1, 10), stay abreast of current best practices for facilitating effective teaching and learning (ASES-S items 2, 11), provide
feedback using consistent language regarding effective teaching and learning practices (ASES-S items 4, 13), and encourage teachers to reflect upon their knowledge, skills, and dispositions regarding effective teaching and learning (ASES-S items 7, 16). The science-specific version of the parallel topic would just have a science focus incorporated within the survey item. The two tests significant at the p < 0.05 level dealt with topics relating to administrators being able to provide experiences that foster and facilitate high levels of teacher motivation towards teaching and learning (ASES-S items 3, 12) and lead observation debriefing conversations with teachers on how students learn (ASES-S items 6, 15). Survey item comparisons not yielding significant differences between the content-neutral and science-specific instructional leadership skills include administrators being able to engage in rich conversations with teachers following instructional observations (ASES-S items 5, 14), recognize errors or misconceptions within a teacher’s instruction (ASES-S items 8, 17), and discuss the rationale behind curriculum and instruction reform (ASES-S items 9, 18). These results are an indication that overall administrator self-efficacy, as compared per parallel survey item, is significantly lower for instructional leadership skills involving science-specific knowledge in a secondary science classroom.

To examine these results in a more general perspective, a paired t-test was calculated using individual administrator responses for all of ASES-S items 1-9 as compared to individual administrator responses for all of ASES-S items 10-18. This test also enabled the researcher to compare values received for SRQ6 to those of SRQ7. Once again, a 1-tailed test was used because content-specific self-efficacy values were expected to be lower than those of content-neutral. A paired test was used because the
same individuals answered both sets of survey questions. Results of the composite t-test are shown in Table 18.

Table 18.

*Composites of content-neutral (SRQ6) versus content-specific (SRQ7) instructional leadership*

<table>
<thead>
<tr>
<th>Composite Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRQ6 vs. SRQ7</td>
<td>1</td>
<td>paired</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01. Statistics based on ASES-S 1-9 vs. ASES-S 10-18.

As seen in Table 18, the composite comparison of administrator-perceived self-efficacy between content-neutral (SRQ6) and content-specific (SRQ7) instructional leadership abilities was significant at the p < 0.01 level. Therefore, administrators view their science-specific instructional leadership abilities to be significantly lower than their content-neutral instructional leadership skills. Qualitative and quantitative data corroborate here as well with fewer administrators confident that they can provide the content-specific feedback they feel science teachers need to improve.

**Ancillary Statistics**

**Science Teacher Data**

As an introductory question for secondary science teachers in the TEES-F survey, participants first answered the Likert-scaled item of whether or not evaluation feedback was received. This question seemed to be the first step in gauging what quality feedback could look like from a science teacher’s perspective. This item received the highest rating throughout the survey in terms of descriptive statistics of mean and mode. The mean for TEES-F item 1 was 4.308, with the remaining means ranging from 2.5 to 3.615. The mode for TEES-F item 1 was at a 5 for a Likert score, with the other modes at the levels
of 3 or 4. The standard deviation for this item was 0.928, which was similar to those of the other survey items. These descriptive statistics illustrate the idea that, for the most point, feedback of some sort is being received from evaluating administrators. This information is crucial when seeking an answer to a question about indicators of quality feedback from an administrator to a secondary science teacher.

Additional ancillary data received from secondary science teachers included comparing survey answers between genders as well as between those individuals who show no interest in pursuing professional development opportunities compared with those who do. Concerning potential gender differences, data tables were reorganized to separate female participant responses from those of males. The resulting descriptive statistics, including mean, mode, and standard deviation are shown in Table 19. Table 19 also includes a column of percentages of 4s and 5s on the Likert-scaled survey items per gender-separated responses. One final column was included to examine percentages of 4s and 5s, by gender, from TEES-F item 20, which directly asks participants whether they were satisfied with the evaluation feedback.

Table 19.

**TEES-F survey perspectives as separated by gender**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
<th>% of 4/5 on item 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>3.26</td>
<td>4</td>
<td>1.003</td>
<td>35.06</td>
<td>50.00</td>
</tr>
<tr>
<td>Males</td>
<td>3.19</td>
<td>4</td>
<td>1.105</td>
<td>33.33</td>
<td>61.11</td>
</tr>
</tbody>
</table>

The descriptive statistics for TEES-F survey perspectives yielded similar results between genders, indicating no major perception differences between males and females.
Males showed a higher satisfaction with evaluation feedback (TEES-F item 20) than females with percentages at 61.11 and 50.00, respectively.

Survey responses were examined for differences in participant perspectives between secondary science teachers who were interested in pursuing professional development opportunities and those who were not. For the purposes of this comparison, participants who responded that their interest in professional development was dependent on the options available were combined with others who responded positively with interest. This was deemed appropriate because if the opportunity was an attractive option to the participant in question, then he/she would be interested. Descriptive statistics for each group are shown in Table 20, with additional columns comparing percentages of 4s and 5s on all TEES-F items and TEES-F item 20 concerning satisfaction with evaluation feedback.

Table 20.

*TEES-F survey perspectives as separated by professional development (PD) motivation*

<table>
<thead>
<tr>
<th>Motivation for PD</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
<th>% of 4/5</th>
<th>% of 4/5 on item 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interested</td>
<td>3.12</td>
<td>3</td>
<td>1.088</td>
<td>20.53</td>
<td>47.37</td>
</tr>
<tr>
<td>Not interested</td>
<td>3.45</td>
<td>4</td>
<td>1.004</td>
<td>52.52</td>
<td>85.71</td>
</tr>
</tbody>
</table>

As shown in Table 20, science teacher participants interested in pursuing professional development responded to TEES-F survey items with a mean of 3.12, a mode of 3, and a standard deviation of 1.088. These statistics were all lower than those participants not interested in pursuing professional development, with a mean of 3.45, a mode of 4, and a standard deviation of 1.004. The last two columns of Table 20 show much larger differences between percentages of 4s and 5s in those interested in
professional development opportunities and those who are not. Specifically, when TEES-F item responses were examined collectively between the two groups, those teachers not interested in professional development responded with 4s and/or 5s on survey items 52.52% of the time, compared to only 20.53% of the time by those interested in pursuing professional development. Comparatively, when TEES-F item 20 was examined alone for participant satisfaction with evaluation feedback, uninterested teachers showed an 85.71% satisfaction response while only 47.37% of teachers interested in professional development opportunities were satisfied with their evaluation feedback.

**Administrator Data**

Ancillary data was examined for secondary administrators where basic comparisons could be made between groups of administrators. Gender was not examined as there was only one female within the group of participants. Categories examined included the self-efficacy of those administrators with science content backgrounds compared to those without, as well as self-efficacy levels of head principals as compared to assistant principals. For the content area comparison, four administrators with science certifications were compared to all other content areas combined. Descriptive statistics were calculated for each administrative group for both content-neutral instructional leadership self-efficacy (ASES-S items 1-9) and science-specific instructional leadership confidence levels (ASES-S items 10-18). The results for content-neutral instructional leadership are displayed in Table 21.
Descriptive statistics for administrator groups concerning self-efficacy of content-neutral instructional leadership were similar to each other. Administrators with science backgrounds responded with a mean of 4.36, a mode of 4, and a standard deviation of 0.543 when questioned about their content-neutral instructional leadership self-efficacy. Comparatively, administrators with other backgrounds scored a mean of 4.10, a mode of 4, and a standard deviation of 0.754. Science experts responded to ASES-S items 1-9 with 97.22% of 4s and 5s on the Likert-scaled items, indicating a high self-efficacy. Similarly, administrators with other content expertise scored an 81.94% for self-efficacy with content-neutral instructional leadership.

The same administrator groupings were then examined for perceived self-efficacy levels within science-based instructional leadership skills (ASES-S items 10-18). Descriptive statistics are displayed in Table 22.

Table 21.

Content-neutral instructional leadership self-efficacy by content area

<table>
<thead>
<tr>
<th>Content area</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>4.36</td>
<td>4</td>
<td>0.543</td>
<td>97.22</td>
</tr>
<tr>
<td>Other</td>
<td>4.10</td>
<td>4</td>
<td>0.754</td>
<td>81.94</td>
</tr>
</tbody>
</table>

Table 22.

Content-specific instructional leadership self-efficacy by content area

<table>
<thead>
<tr>
<th>Content area</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>4.47</td>
<td>5</td>
<td>0.609</td>
<td>94.44</td>
</tr>
<tr>
<td>Other</td>
<td>3.28</td>
<td>3</td>
<td>0.791</td>
<td>40.28</td>
</tr>
</tbody>
</table>

Self-efficacy levels for science-specific instructional leadership, as seen in Table 22, are higher for administrators with science backgrounds than those administrators with
other content expertise. Specifically, science specialists responded with a mean of 4.47, a mode of 5, and a standard deviation of 0.609. They also scored a 94.44% with answers of 4s and 5s on Likert-scaled questions concerning science-specific instructional leadership skills. Comparatively, administrators with other specializations responded with a self-efficacy mean of 3.28, a mode of 3, and a standard deviation of 0.791. Only 40.28% of these Likert-based answers were in the 4 and/or 5 range.

Additional statistical tests were conducted within administrator content groupings to compare differences between self-efficacy levels within content-neutral and content-specific instructional leadership skills. A t-test was first conducted for administrators with backgrounds in science between ASES-S items 1-9 responses and those from ASES-S items 10-18. The t-test was paired because the same individuals were responding to both types of survey items, and 2-tailed because there was no expectation for content-neutral instructional leadership values to be different from those of content-specific. Table 23 displays the resulting p value of 0.2104, which was not significant. Therefore, there was no significant difference between content-neutral and content-specific instructional leadership self-efficacy levels of administrators with science expertise.

Table 23.

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>General IL vs. Science IL</td>
<td>2</td>
<td>paired</td>
<td>0.2104</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01. Statistics based on ASES-S 1-9 vs. ASES-S 10-18.

Table 24 shows a similar t-test comparing content-neutral and content-specific instructional leadership self-efficacy levels for administrators who do not have science
backgrounds. This t-test was paired as previously explained, but only 1-tailed because the expectation was that content-neutral instructional leadership skills were expected to be higher among non-science experts than those of content-specific. As displayed below, the t-test was significant at the $p < 0.01$ level, with a $p$-value of $6.657 \times 10^{-15}$. This result indicates that administrators without science backgrounds have significantly lower self-efficacy with science-specific instructional leadership skills than with content-neutral skills.

Table 24.

*Content-neutral versus content-specific instructional leadership (IL) self-efficacy levels for non-science experts*

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>General IL vs. Science IL</td>
<td>1</td>
<td>paired</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

Note: * = $p < 0.05$, ** = $p < 0.01$. Statistics based on ASES-S 1-9 vs. ASES-S 10-18.

The final division of administrator ancillary statistics examined the difference, if any, existing between self-efficacy levels of head principals and assistant principals as it pertained to content-neutral and science-specific instructional leadership skills. Table 25 displays the resulting descriptive statistics for content-neutral instructional leadership skills as divided by job title.

Table 25.

*Content-neutral instructional leadership self-efficacy by job title*

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Principal</td>
<td>4.28</td>
<td>4</td>
<td>0.615</td>
<td>91.67</td>
</tr>
<tr>
<td>Assistant Principal</td>
<td>4.14</td>
<td>4</td>
<td>0.737</td>
<td>84.72</td>
</tr>
</tbody>
</table>
Descriptive statistics are similar between head and assistant principals and their content-neutral instructional leadership self-efficacy. Head principals had a slightly greater percentage of 4s and 5s throughout their responses (91.67%) than did assistant principals (84.72%). The same division by job title is seen in Table 26 concerning science-specific instructional leadership self-efficacy levels. The descriptive statistics with regards to science-based skills show that head principals possess greater self-efficacy than do assistant principals. Head principals have a mode of 4 and a 72.22% response percentage of 4s and 5s on survey items related to science, compared to assistant principals with a mode of 3 and a percentage of 4s and 5s with their Likert-scaled responses at 51.39%.

Table 26.

*Science-specific instructional leadership self-efficacy by job title*

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
<th>% of 4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Principal</td>
<td>3.72</td>
<td>4</td>
<td>0.454</td>
<td>72.22</td>
</tr>
<tr>
<td>Assistant Principal</td>
<td>3.65</td>
<td>3</td>
<td>1.090</td>
<td>51.39</td>
</tr>
</tbody>
</table>

Finally, two t-tests were conducted to compare the self-efficacy levels of head principals and assistant principals, respectively, with regards to their content-neutral and science-specific instructional leadership skills. Table 27 displays the results for the t-test focusing on the instructional leadership skills of head principals. The t-test was 2-tailed because there were no prior expectations on head principal self-efficacy levels between general and science-based instructional leadership skills. The resulting p-value was significant at the p < 0.01 level, indicating a significantly lower perception of self-efficacy for science-specific instructional leadership skills of head principals as compared to those of content-neutral instructional leadership.
Table 27.

*Content-neutral versus content-specific instructional leadership (IL) self-efficacy levels for head principals*

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>General IL vs. Science IL</td>
<td>2</td>
<td>paired</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01. Statistics based on ASES-S 1-9 vs. ASES-S 10-18.

Table 28 shows similar t-test results for assistant principals. Specifically, self-efficacy perceptions were significantly lower for assistant principals and their science-specific instructional leadership skills as compared to perceptions of content-neutral instructional leadership skills.

Table 28.

*Content-neutral versus content-specific instructional leadership self-efficacy levels for assistant principals*

<table>
<thead>
<tr>
<th>Comparison</th>
<th># of Tails</th>
<th>Type of t-test</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>General IL vs. Science IL</td>
<td>2</td>
<td>paired</td>
<td>3.729x10^{-06}***</td>
</tr>
</tbody>
</table>

Note: * = p < 0.05, ** = p < 0.01. Statistics based on ASES-S 1-9 vs. ASES-S 10-18.

**Major Findings**

Secondary science teachers are divided on the type of feedback needed for growth. While 75% of science teachers felt that feedback from administrators was necessary for growth, there was little consensus on the format that the feedback should take. Some science teachers (30%) shared needs for feedback focused on content-neutral components of teaching, explaining that they were already competent with the specific science content. Another 40% of science teachers desired a content-specific focus to feedback as a necessity to push their teaching past the point of basic pedagogy. These
teachers explained that they needed pointers on how to better run hands-on activities or new strategies to use with difficult concepts. Finally, 5% of science teachers shared that they needed both content-neutral and content-specific feedback to continue growing as professionals in the classroom. With regards to the new Nebraska College and Career Ready Standards for Science coming in the spring of 2018, science teachers communicated that their needs were comprised of new and necessary resources, time to process and implement the new standards, collaboration with peers, and professional development opportunities.

Science teachers see more needs for content-specific feedback than do administrators. Only 10% of administrators shared that content-specific feedback was necessary for science teacher professional growth, as compared to 40% from science teacher perspectives. Many administrators felt that their experiences in the classroom, regardless of content specialization enabled them to provide necessary feedback for growth to all teachers. This might be related to the idea that administrators with or without science backgrounds are routinely expected to provide feedback in science classrooms, so they make do as best they can. On a similar note, when science teachers were specifically asked whether they preferred content-neutral or content-specific feedback, and not what they needed for professional growth in the classroom as explored in the previous section, 28.6% responded that they had a preference for content-neutral feedback, with 52.4% of science teachers describing a preference for feedback including both content-neutral and content-specific components. There were no science teachers, when specifically asked, who communicated a desire for solely content-specific feedback.
in the science classroom, although 40% shared that this was the type of feedback they
needed to continue growing on a professional basis.

**Content-neutral feedback differs greatly from content-specific feedback.** As
described by science teachers, these two types of administrative feedback are tailored to
different aspects of teaching. Teacher 16 aptly described this difference with the
statement that content-specific feedback “…focused on the science of my classroom—not
on the general flow of my classroom. Both were very constructive, just in different
ways.” Both science teachers and administrators described content-neutral feedback as
involving components of classroom management, student-teacher-parent relationships,
instructional strategies, and checks for understanding. Science teachers added
experiences with content-neutral feedback that included discussions of student
engagement, closure, and learning targets, while administrators specifically mentioned
assessment strategies, and the importance of exploring time on task, student
collaboration, technology usage, and the district instructional model.

Conversely, science teachers described experiences with content-specific
feedback as involving discussions of ACT preparation, pacing, teacher grasp of content
and delivery methods, connections made to real world issues, experiences with hands-on
or laboratory activities, the provision of resources, examples of scientific concepts, and
suggestions for laboratory changes. Administrators did not offer any examples of content-
specific feedback that had been provided to science teachers.

Science teachers view administrators as capable of providing content-neutral
feedback. Through the compilation of several survey items, this result can be viewed
from various vantage points. A total of 85% of science teachers surveyed were positive
about and receptive to content-neutral feedback from their evaluating administrators. Similarly, 95% of science teachers felt that content-neutral feedback was purposeful to receive. Finally, 75% of science teachers felt that administrators were capable of meeting their instructional needs in their offering of content-neutral feedback. These numbers communicate the importance of the inclusion of content-neutral components within evaluative feedback from administrators to science teachers, and the belief by science teachers that their administrators are capable of providing such feedback.

**Administrators view themselves as capable of providing content-neutral feedback.** Similar to the opinion of secondary science teachers, administrators communicated a high self-efficacy with the provision of content-neutral feedback to science teachers. All administrators surveyed felt capable of providing content-neutral feedback and 87% of them responded with Likert-scaled answers of 4s or 5s in response to their confidence with content-neutral instructional leadership skills.

**Science teachers view administrators as less capable of providing content-specific feedback.** From a science teacher perspective, administrator capacity to provide content-specific feedback in a secondary science classroom is significantly lower than that of content-neutral feedback. Only 68.4% of science teachers were receptive to content-specific feedback from their evaluating administrators, as compared to 85% reception with content-neutral feedback. In addition, comments received communicated a more negative view of administrator ability to provide such specialized feedback. Conversely, 80% of science teachers viewed the content-specific feedback they had received in the past to be helpful to them. That being said, when science teachers
communicated their desires for professional growth, 33% felt their administrators were unable to meet their requested needs for content-specific feedback.

**Administrators view themselves as less capable of providing content-specific feedback in science classrooms.** While 57.1% of administrators felt fully capable of providing the necessary content-specific supports to secondary science teachers, 28.6% did not feel qualified to provide such specialized feedback. Resulting administrator self-efficacy levels were significantly lower with regards to content-specific instructional leadership skills than compared to those of content-neutral instructional leadership. Administrators scored themselves significantly lower on six of the nine instructional leadership skills that lent themselves to the provision of science-specific evaluative feedback.

**Administrators with science certifications have higher self-efficacy with science-specific instructional leadership than do administrators with other backgrounds.** Understandably, secondary administrators with prior experience teaching in a science classroom showed more confidence with science-specific instructional leadership skills than did administrators with other certifications. No significant difference was found between self-efficacy levels of content-neutral instructional leadership amongst administrators with science backgrounds and those without. Administrators with science backgrounds also showed no significant difference between content-neutral and content-specific instructional leadership self-efficacy levels. However, administrators with content certifications outside of the science realm showed significantly lower self-efficacy levels with science-specific instructional leadership than content-neutral instructional leadership. As discussed with the previous major finding,
these administrators were well aware of their lower self-efficacy levels when relating to science-specific leadership. Some administrators acknowledged this dearth in their experience and discussed a need for improvement in this area.

Head principals showed greater self-efficacy with science-specific instructional leadership skills than assistant principals. As seen in the previous major finding, there was no significant difference between self-efficacy levels of content-neutral instructional leadership skills amongst building administration positions. However, head principals showed greater self-efficacy with regards to content-specific instructional leadership skills as compared to assistant principals. That being said, both head and assistant principals displayed significantly lower self-efficacy with science-specific instructional leadership than with content-neutral instructional leadership skills.

Science teachers are divided on their satisfaction with the teacher evaluation and feedback process. Secondary science teacher perceptions show that, overall, they believe the process of teacher evaluation makes them a better teacher, but they do not believe that their evaluating administrators can provide the feedback they need to grow as professionals in the science classroom. Sixty percent of science teacher participants felt the teacher evaluation process made them a better teacher, while 35% were confident that their evaluating administrators could provide for their needs to continue growing professionally. These two numbers are an indication of the degree of satisfaction with the evaluation and feedback process and are somewhat at odds with one another from the start. When those numbers are examined from the opposing side, it can be seen that 40% of participating science teachers felt that the evaluation and feedback process made little
to no impact on their teaching, with 60% of the impression that their evaluating administrators are unable to provide them with the type of feedback they need for growth.

Science teachers are more interested in incorporating content-neutral feedback into their teaching than content-specific, regardless of administrator expertise. There was no significant difference in the incorporation of feedback into classroom teaching based on administrator expertise in the science content, as was expected. However, an interesting trend of feedback incorporation was identified in that secondary science teachers were significantly more likely to incorporate content-neutral feedback into their teaching than content-specific feedback, regardless of the administrative source of the feedback provided. This finding may be an indication of lower science teacher confidence with regards to content-neutral skills in the classroom than those of content-specific skills. It could also be that science specialists don’t put much stock into the content-related feedback they get from administrators because they are not in the classroom with them every day. Clarification on this major finding would be valuable for content-specialist professional development ideas.

Science teacher interest in professional development linked to satisfaction with the teacher evaluation and feedback process. Specifically, science teachers who expressed interest in actively seeking out professional development opportunities showed lower levels of satisfaction with the teacher evaluation and feedback process than those science teachers not interested in professional development. It is unclear at this time whether the lower levels of satisfaction with teacher evaluation and feedback led to the greater interest in seeking outside professional development opportunities, or if, conversely, greater interest in professional development and growth resulted in
frustration and lower satisfaction with teacher evaluation and feedback. On the flip side, science teachers who were not interested in actively seeking out professional development opportunities had correspondingly higher values of satisfaction with the teacher evaluation and feedback process. Similarly, it would be interesting to see if the disinterest in professional development is a result of higher satisfaction with feedback and resulting professional growth from positive experiences with teacher evaluation, or if science teachers with no goals for growth are naturally more satisfied with feedback received from administrators. Addressing this cause and effect quandary would be a potential direction for future research to examine.
Chapter 5: Discussion

This mixed methods study examined perceptions of both secondary science teachers and their evaluating administrators to explore the current state of feedback in a secondary science classroom, and what that feedback needs to look like to support the professional growth of highly specialized educators. A mixed-methods research design was used to address the main research question: What are qualitative and quantitative indicators that define quality feedback from an administrator to a secondary science teacher? In an attempt to answer this overarching question, seven sub-research questions were posed that focused on the type of feedback science teachers need for professional growth, the major differences between content-neutral and content-specific feedback, how science teachers view their administrator’s capacity to provide both content-neutral and content-specific feedback, how administrators view their own abilities to provide content-neutral and content-specific feedback, and overall science teacher satisfaction with the feedback received from their evaluating administrators.

Both secondary science teachers and administrators were surveyed for this study to examine both sides of teacher evaluation and feedback offered in a science classroom. A total of 26 science teachers and 12 administrators from four high schools in four districts across the state of Nebraska participated in completing surveys specific to each group: the TEES-F instrument for science teachers and the ASES-S instrument for administrators. Qualitative data was collected from both science teachers and administrator participants using open-ended questions from respective survey instruments and examined for common themes. Quantitative data was collected concurrently from both TEES-F and ASES-S instruments with Likert-style questions and analyzed using
descriptive statistics, such as mean, mode, and standard deviation. Both paired and independent samples t-tests were conducted between certain findings to test for significance. Resulting outcomes from both qualitative and quantitative data were then examined together to check for convergence. All data was analyzed separately for science teachers and administrators, and then common trends and themes were examined between the two groups of participants.

**Contextual Framework Reflection**

In an attempt to examine my own views of both sides of the teacher evaluation and feedback process, I completed both the TEES-F survey for teachers and the ASES-S survey for administrators. My personal Likert-scaled quantitative answers from my science teacher point of view on TEES-F showed extremely low satisfaction with the teacher evaluation process. I can personally state, as I am unable to for my study participants, that this low satisfaction level is directly related to my dissatisfaction with the feedback process. I was craving feedback to help me grow, but just getting “Great job” comments, which, ironically enough, made me stop trying as hard. Aside from my internal drive to improve, I had no pressure being put on me to get better. Self-directed evaluation years provided zero conversations about my work, so I would go for two years at a time without even talking with my supervisor about my work. That being said, I was extremely interested in attending any professional development opportunities that came around in an attempt to keep moving forward in the classroom. This interest was solely influenced by my determination for continuous growth.

In examining my open-ended, qualitative answers from my TEES-F survey completion, I responded that the evaluation process did not make me a better teacher
because I never got any purposeful suggestions for improvement aside from my first year of probationary teaching. My evaluator was a former science teacher, but this was not evident in the feedback that I received. I think this was even more disappointing to me because I was starved for feedback and even had an administrator who knew the content. This is the point where my survey became less purposeful because I had no answer for “Can you give a specific example of an administrator providing you with feedback related to your content area?” This was the case with many of my study participants as well. Because I could not offer any examples of science-specific feedback, I could not talk about how that differed from other feedback I had received. I could give an example of content-neutral feedback, but only feedback I had received in my first year of probationary teaching. Therefore, I had to choose content-neutral feedback as more helpful because it was all that I knew and had ever received. This, in the spirit of reflection, might have led to an overinflated view of the value secondary science teachers placed on content-neutral feedback. However, as I look back over my data, I see that many of the participants who did not receive content-specific feedback still claimed that both were helpful and that one type of feedback did not trump the other. Similarly speaking, I claimed that I would welcome receiving both content-neutral and content-specific feedback from administrators that highlighted my areas of weakness for the sake of well-rounded professional growth in the classroom.

That being said, I do not want my reflection over these survey items to come off to any of my readers as administrator bashing. I am well aware of the pressures that are put on administrators to complete so many more tasks than just those related to instructional leadership. In my experiences with administration as a dean of students over the past
three years, I have lived the pull between instructional leadership and all of the other hats that administrators have to wear. My responsibilities focus primarily on student discipline, student attendance or tardy issues, and student academic supports, with a little bit of teacher evaluation sprinkled in. Don’t worry—I am well aware that my responsibilities as a dean are greatly overshadowed by those of my head and assistant principals. So, in an effort to tell both sides of my story, I have also attempted to honestly fill out the same ASES-S survey as the administrator participants in my study. With my science background, I would consider myself most confident in science classrooms, then math, followed by language arts and reading, and finally social studies as my area of lowest confidence. For the Likert-scaled quantitative questions concerning content-neutral instructional leadership efficacy, I rated myself fairly high with five 5s, two 4s, and two 3s for answers. Comparatively, I rated myself even higher with 5s across the board with content-specific instructional leadership skills. This may seem a little arrogant, but with a Master’s degree in biology, I have a high level of confidence with anything science-related, including instructional leadership. This slight disparity between self-efficacy levels highlights the same idea that was referenced by Donder (2011) and Torff and Sessions (2005; 2009) with specialist teachers having greater confidence with their content than their pedagogy.

The open-ended, qualitative questions on the ASES-S were more informative about my views as an administrator with science expertise. The feedback that I offer to the classroom teachers I supervise includes information concerning our district instructional model, classroom organization and management, specific highlights that I observed during the period, questions that I have for the teacher, and then suggestions
for improvement. Because of my frustrations with the lack of feedback during my teaching years, I have never left an evaluation without offering some avenue to explore for growth. Sometimes this involves more questions and a brainstorming session with the teacher being evaluated to come up with something purposeful. My science background influences my leadership by the confidence that I feel leading instruction in a science classroom. Some science teachers approach me for advice and feedback on strategies outside of evaluation, but that could be because I am either not their evaluator or not their head principal. A dean of students title does not carry with it the same trepidation as that of head principal.

My science expertise also helps me in classrooms of other content areas. By saying that, I do not mean that the strategies I know through teaching science lend themselves to the teaching of a foreign language or a physical education class. I do not believe that I can confidently say that good instruction is good instruction, regardless of the content. The results of this study do not indicate that all science teachers or their evaluating administrators believe that statement either, although some members of both groups of participants said as much. What I mean when I say that my science background helps is that I have been trained to think like a scientist, to ask questions to understand the unknown. These questions come naturally to me when I am observing teachers and during our follow-up feedback conversations. In asking several questions, I begin to wrap my head around what it is like to teach various content areas. I would love to take this one step further to understand what it would be like to be a current learner of this content outside of my comfort zone.
When answering survey questions about what effective science instruction looks like and what science teachers need to grow professionally, I found myself reflecting on what “doing” science meant to me, both as a science teacher and a traditionally trained scientist. The practices of inquiry, hands-on exploration, and making real world connections between the science and the learning were the first key ideas that came to mind as essentials in any science classroom. However, these practices are not easy to incorporate. Teaching using inquiry methods is not as straightforward as it may seem to an outside observer. These methods take time and involve students actually experimenting with various solutions to explore a given problem. In comparison, lecturing about said problem and just giving students notes over the solution is simple and involves a significant reduction in time spent. Science teachers need guidance on how to incorporate more of the inquiry, the hands-on “doing,” and making connections between science and the real world in order to grow professionally. I would say that, as a science content expert, I could provide some of that feedback and another mind with which to brainstorm ideas, but I would definitely benefit from related professional development myself, regardless of my expertise. Coincidentally enough, these are the ideas behind the recent Next Generation Science Standards and the influence for the Nebraska College and Career Ready Standards for Science that are being incorporated in the spring of 2018. I am aware of the standards and we are starting to talk about what the roll-out will look like in my current district, but we do not know yet what professional development opportunities or other supports will be available to either science teachers or administrators to help with implementation. Aside from that, there have been no mentions of how to address these changes with feedback in the science classroom.
When I began coming up with ideas for a dissertation topic, I chose one that was near and dear to my heart, one that indirectly led to my change in career direction, from a science teacher to an administrator. When people find out that I am working on my doctorate, they inevitably ask about my dissertation topic. As I explain that I examined teacher evaluation and feedback from an administrator to a teacher in a secondary science classroom, I get a variety of responses. There are always some blank or glazed-over eyes by the time I am done talking, some excitement—this response is typically from other teachers, especially those in the science field, and I get a response that I can only describe as uncomfortable or negative. I have had fellow administrators debate that good teaching is good teaching and that content should not matter when it comes to evaluation. This response has always surprised me and, before conducting my literature search and research, typically served to shock me into silence. I never knew how to respond even though I did not agree with their statements. I think the reason for my shock was that the mannerisms of those who told me that my research was not necessary or important were often somewhat defensive or argumentative. Initially, this served to make me question whether they were right and if this was a topic that was not necessary to explore. Eventually, I kept coming back to the same idea and had to politely disagree that this topic was worthy of research. What would I say to those naysayers now that my research is complete? I would say that my data show that both science teachers and administrators at the secondary level identified content-specific feedback as important to both receive and provide. This information in no way overshadows the importance of content-neutral feedback as many science teachers and administrators also highlighted the importance of such information. My study is important in providing information
about content-specific feedback that administrators may not realize is important to many in the field of education. A science classroom and laboratory setting is so much different from that of any other subject matter, in that students are learning through questioning and exploration activities that help them to understand and make real world connections. I think these differences coupled with a unique vocabulary and skillsets that do not transcend other content areas serve to intimidate those without the expertise to provide such feedback. Sometimes people would prefer to deny the importance of something than to admit that they don’t have the skills to provide such feedback.

**Implications of Findings**

Secondary science teacher participants from this study communicated that they believed feedback from their evaluating administrators was purposeful for professional growth. These perception results mirror ideas in the literature concerning the critical role that feedback plays in not only connecting teacher actions to student learning, but helping teachers to grow professionally in the classroom (Blase & Blase, 1999; 2004; Danielson & McGreal, 2000; Hattie & Timperley, 2007; Marzano, et al., 2011; Ritter & Barnett, 2016; Roberge, 2014). Concerning what this feedback should look like, science teacher participants were particular in their comments that they wanted specific feedback that was individualized to them and their teaching. Such responses included, “…Sometimes the canned responses are generic, and could be copied and pasted to about any situation” (Teacher 12) and “Some of it was way above age appropriate but some of it was useful” (Teacher 9). These findings are similar to those of Feeney (2007) and Meadows (2015) who talked about the importance of feedback perceptions in being appropriate and connected to student learning rather than comments duplicated into each completed
evaluation. If feedback is not perceived as purposeful, science teachers have shared that they do not put too much stock into the information received. Perceptions are a key component of human nature when it comes to accepting feedback, as the process can be intimidating and anxiety-producing if perceived to be for purely accountability purposes. However, when feedback is perceived as purposeful with a focus on improving instruction, that evaluation process becomes a safe environment for a science teacher to work with his/her administrator as a coach and mentor (Danielson & McGreal, 2000).

The feedback that I received from secondary science teachers in this study sent a variety of different messages about the perceptions that exist concerning feedback. I found myself frequently saying that science teachers and/or administrators were split on their perceptions of what type of feedback was necessary for professional growth in the classroom, whether or not content-specific supports were necessary for such growth, capacity for provision of both content-neutral and content-specific feedback, and the level of satisfaction with the feedback process. Roberge (2014) also found similar feedback perceptions that were all over the place in terms of reaching agreement on what teachers desired from their evaluating administrators. Comparable to the current study, some teachers viewed administrator feedback as valuable and necessary for growth, while others viewed feedback as a waste of time. These variations in responses made simple concluding statements difficult to make, but this is sometimes the nature of perception data. There are so many different explanations for the variations observed during this study. Literature discusses feedback reactions that vary based on prior experiences, current mindsets, and biases that exists for accepting offered feedback (Govaerts, et al., 2013; Hattie & Timperley, 2007; Khachatryan, 2015). Examples of each of these
circumstances are supported by the results of the current study. Two science teachers made a point to discuss negative experiences they have had with feedback and evaluation in the past: “Previous teacher evaluations didn't lead to much growth” (Teacher 10), and “I had a difficult experience where I taught before” (Teacher 7). Both types of non-productive experiences might lead science teachers to be wary of feedback in the future.

In addition, significant differences were identified between the mindsets of science teachers interested in actively pursuing professional development and those who were not, although these responses were split in themselves. Some science teachers interested in professional development had a negative perspective on the process of feedback in general and had obviously not had good experiences with the process while others were positive and open to any suggestions. Similarly, science teachers uninterested in professional development opportunities were at times negative about the teacher evaluation process and the resulting feedback, while others were positive and full of hope. Finally, some bias was evident in how science teachers viewed their administrators. For example, Teacher 19 shared that his/her evaluating administrator was formerly a science teacher, but then prefaced that it had been a long time since he had been in the classroom teaching. So, even though Teacher 19 had a science expert for an administrator, there was not much stock put into the feedback received because of the length of time that the administrator had spent outside of the classroom environment.

Literature at the secondary level shows that there is little focus on the practice of providing content-specific feedback to teachers and the role administrators can play in the improvement of classroom instruction (Khachatryan, 2015; Lochmiller, 2016; Lochmiller, et al., 2012). Perceptions from the results of the current study show
variations concerning this idea, including science teachers who feel like they can manage on their own with no feedback, those who recognize their weaknesses and appreciate any type of feedback, those who look to outside experts like a science-based instructional coach or a peer to offer them expert content-specific feedback, and science teachers who recognize the value of content-specific feedback but do not have expectations for receiving that type of feedback from their evaluating administrators. Science teacher perceptions of feedback in the secondary science classroom were similar to those of instructional leaders from this study. Administrator variations included: the claim that they could provide the necessary feedback regardless of their teaching expertise, the idea that they would do the best they could with the available skills alongside an awareness of their weaknesses, and administrators who recognized and recommended others as experts, distancing themselves from the need for provision of content-specific feedback in a science classroom.

The results of this study will be impactful to the realm of education and instructional leadership because they show that subject matter is important to consider when evaluating teachers and providing quality feedback in a specialized secondary classroom. Nelson and Sassi (2000) found that offering feedback focused solely on pedagogy is not enough to improve content-based practices. However, this study showed that content-neutral classroom management-type observations are purposeful as well and perhaps more widely incorporated into teaching following the feedback process. Generalizations can be made by revisiting the main research question, namely “What are qualitative and quantitative indicators that define quality feedback from an administrator to a secondary science teacher?” According to secondary science teacher participants,
quality feedback from an evaluating administrator should embrace both content-neutral and content-specific components of classroom instruction. It would also have a potentially direct impact on classroom teaching if administrators incorporated content-neutral strategy suggestions within feedback conversations. This indicator is based on high teacher and administrator perceptions of administrator competency with content-neutral instructional leadership and teacher propensity to incorporate content-neutral feedback into their teaching more often than content-specific. There are many ways to speculate about why this might be: science teachers might put more stock into content-neutral feedback as the traditional strength of administrators; perhaps, as Torff and Sessions (2005; 2009) would suggest, science teacher strength is in the content and they have collective needs for supports in pedagogy; maybe content-neutral suggestions make up the bulk of the evaluative feedback received as is the current nature of feedback, so naturally they would be incorporated into the classroom more often; or perhaps science teachers are not interested in content-specific advice of an expert administrator because, as Lochmiller (2016) has suggested, this can be perceived as the administrator forcing their teaching style onto the science teacher. Therefore, making content-specific feedback available is desired by secondary science teachers, but forcing it onto them might end in the rejection of the suggestion.

The long-standing opinion in education that good teaching is good teaching regardless of the content area was shared by two science teachers (Teachers 12 & 18) and an administrator (Administrator 2) within this study. To this statement, I would pose the question: Is quality instruction more than just good pedagogy? From the results of this study, it would seem that while pedagogy plays a large role in quality instruction, there is
an added element of content and content delivery that is impactful to feedback discussions. This element has been recognized and described by Shulman (1986) as Pedagogical Content Knowledge, with additional components of instructional leadership incorporated into Stein and Nelson’s (2003) idea of Leadership Content Knowledge and nested learning communities. Even if content is not the primary focus of feedback offered, secondary science teachers in this study have shown interest for content to still be a part of the conversation (see Figure 1). Seven science teachers and four administrators claimed there was something unique about being in a science classroom that would be benefitted by more content-specific feedback for improvement. Only two science teachers, when asked to share an example of content-specific feedback that had been offered by their evaluating administrator, shared specific, non-generalized science content feedback: how to better structure a lesson around phase changes, and a suggestion for controlling an additional variable that was being introduced into the laboratory setting. Common, more generic responses received from science teachers concerning an example of content-specific feedback included a focus on the teacher’s grasp of the science content, his/her quality of delivery, connections made to real world situations, student engagement throughout the classroom, or that there were many hands on labs and activities. These results make me question whether evaluating administrators have a true grasp of the science content that they are supervising. Literature shows a dearth of science expertise amongst administrators, sometimes even within those who have taught science at some level before (Khan, 2012). The results of this study corroborate those of other studies that show an awareness by both science teachers and their evaluating administrators that capacity and self-efficacy with offering content-specific feedback in a
science classroom is much lower than that of content-neutral feedback, regardless of what perceived needs may be (Lochmiller, 2016; Lochmiller & Acker-Hocevar, 2016; Lowenhaupt, et al., 2017; Meadows, 2015). As the results of this study and those of Lochmiller (2016) and Meadows (2015) show, administrator self-efficacy and instructional leadership actions are affected by the complexities of science content, as 60% of science teachers felt their evaluating administrators were not capable of providing feedback necessary for growth. Self-efficacy levels of evaluating administrators with science-specific instructional leadership skills were significantly lower than those connected with content-neutral instructional leadership skills. Although many science teachers were interested in receiving content-specific feedback, there was a significant amount of doubt on whether their administrators would be capable of providing such feedback. As in my mechanic analogy, many science teachers were well aware that their evaluators could not “talk the talk” when it came to having content conversations about science teaching. So then my question becomes how administrators could make such blanket statements as commenting on a science teacher’s grasp of content knowledge or the completeness and quality of the lecture without the background information of the content being taught. How can they be confident that their science teachers have a strong grasp of content if they have no training in the content? While it may be unrealistic to expect secondary administrators to be content experts in every possible course they might supervise, if they are not at least content competent, then what message are we sending to our science teachers? Administrators, regardless of their content expertise, are expected to guide the teaching and learning that is going on in their building. As literature has shown (Lochmiller, et al., 2012; Lowenhaupt, et al., 2017), when administrators have
reduced knowledge about the content they are evaluating, there is not much pressure on teachers of that content to perform accordingly. For example, if a science teacher had the perception that his/her evaluating administrator was not knowledgeable about his/her content area, as many shared in the current study, that teacher may feel decreased pressure to perform at the top of his/her game, which can lead to stagnation in the classroom over time.

Although participating science teachers were sometimes well aware that their evaluating administrator was unable to provide content-specific feedback to them, they were, for the most part, satisfied with that and had no expectations for anything otherwise. Teacher 18 stated, “No. My evaluator cannot provide that feedback. In addition, my evaluator has a very full plate of assignments and I would not expect them to be able to meet these needs. Rather, they could be met from a department setting, Science Instructional Coach, Curriculum Coordinator or ESU support staff.” Is the culture of feedback one in which we do not expect the evaluating administrator to contribute to the improvement of instruction in a content-specific classroom? One in which we are not upset if our supervisors are not well-versed enough in our specialty to offer supports? Some of the participating teachers in this study showed frustration with the lack of content expertise exhibited by administrators in the science setting, as was supported in the literature by Roberge (2014). Danielson and McGreal (2000) have found that when teachers have more expertise than their evaluators, this undermines the evaluation process. Oddly enough, the results of my study show several examples where secondary science teachers have stated that their evaluating administrator cannot provide them with the feedback necessary for professional growth, yet they still felt that the
teacher evaluation and feedback process made them a better teacher. Similarly conflicting results come about when the results of this study are compared to the literature that revealed teachers as disinterested in receiving feedback or suggestions from an administrator who was not an expert in their content matter (Lochmiller, 2016; McAlpine, 2012; Roberge, 2014). Many of the participating science teachers in the current study mentioned that their interest in feedback offered was influenced by the content knowledge of the administrator offering feedback. That being said, there were also many participants who claimed they would be open-minded to any feedback offered, regardless of the content focus. Is this open-mindedness a sign of a growth mindset in these individuals, or is the culture of feedback such that they have to be open-minded because receiving content-specific feedback is not their current reality?

Administrators have largely been touted as experts in content-neutral pedagogy, a statement with which both science teacher and administrator participants from the current study would agree. Donder (2011) and Torff and Sessions (2005; 2009) would follow that statement with one that says that studies of teacher efficacy have shown that while administrators have no concerns over the content knowledge of teachers, they often find them lacking in pedagogical skills. From the results of this study that show administrators as having significantly lower capacity in science instructional leadership when compared to general, I would ask, once again, how administrators know how advanced the content knowledge of science teachers is without the background to gauge that for themselves. It appears that there is an assumption that science content knowledge is solid for secondary science teachers, although the preparatory classes that would impart purposeful teaching strategies for teaching said content can do no more than scratch the surface of the
information that is out there. To offer a personal example, as a non-traditional science teacher entering the field with a Master’s degree in biology, I was given a certification in Natural Sciences, which meant that I was qualified to teach any science class offered. That being said, I am not sure I have the expertise to help students with their homework in an Astronomy class, much less teach it. I have understanding enough of most sciences to carry on a conversation or follow an explanation from an expert, but teaching the topics myself is another story. At one point in my teaching career, I was asked to teach Honors Anatomy and Physiology, which I had never even taken as a student much less been trained to teach. That was a year of struggles for me, in which I had to learn the information alongside my students in an attempt to stay one step ahead of them. The assumption that there are no concerns with regards to teacher content knowledge is unsettling in light of my personal experiences with teaching science, even as a “science content expert.”

There seems to be culture in education that equates instructional leadership with content-neutral skills and keeps anything content-related separated (Lochmiller & Acker-Hocevar, 2016). The results from this study call for a cultural shift in recognizing the importance of content needs in feedback that is designed for professional growth. Some districts have shifted in their recognition by employing instructional coaches in the science content area, or have put the content expertise in the hands of science peers to offer content-specific feedback to each other. This acts to remove the administrator as an instructional leader and creates a culture of accountability with no instructional improvement goal with regards to teacher evaluation. Of the two districts participating in this study that employ general instructional coaches, one is losing said coach at the
completion of the current school year due to budget cuts. In addition, pressures on teachers limit the time they have available to offer feedback to their colleagues, regardless of how important they might see that action. Without the guarantee of funding and time for alternative experts to offer science teachers content-specific feedback, the onus falls back onto the shoulders of the administrator to find a way.

The current study included 33.33% (4/12) of administrators with expertise in teaching secondary science classes. That number is much higher than is typically seen in school settings or as referenced in the literature (Halverson, et al., 2011; Khan, 2012; Lowenhaupt, et al., 2017), with values typically between 5 and 10%. On a personal note, only one of the 15 (6.67%) administrators that I have worked with over the past 13 years (not all as my evaluating administrators) had a background in science. That being said, 14 of the 26 (53.85%) participating teachers from this study have had experiences with a science-expert administrator at some point during their sometimes extensive teaching careers. This enabled participants to offer examples from a variety of experiences, although they were instructed with their Likert-scaled questions on the TEES-F instrumentation to refer to their most recent evaluation. Responses show that even when science teachers were paired with administrators with science expertise, the feedback offered was still of a general nature, with only a couple of exceptions. The reason for this escapes me. Is the culture of teacher evaluation and related feedback so rooted in content-neutral instructional leadership that this has become just the way things are done, regardless of the content expertise of the evaluating administrator? As I reflect back on the type of feedback I offer in a science classroom while evaluating, I find that I offer more content-general feedback as well, even though I rated myself as more capable of
providing science-specific feedback in the ASES-S survey. Lochmiller (2016) reported a similar result to that of the current study with math and science experts offering similar feedback to that of the non-expert administrators. This feedback from the experts, although content-neutral in nature, was found to hold a greater value and was viewed as more credible by the receiving science teachers. Therefore, while science teachers have communicated a need for content-specific feedback, they are still somewhat satisfied when they receive content-neutral comments, and many participants from the current study actually preferred to receive a mixture of both content-neutral and content-specific feedback. Additional literature has shown perceived evaluation quality to increase when content experts are providing feedback to content teachers, thus leading to improvements in the teaching and learning happening in science classrooms (Meadows, 2015; Rhoton, 2001; Toch & Rothman, 2008). The findings of this study confirm these results as administrators with expertise in science content had significantly higher self-efficacy levels with regards to science-based instructional leadership skills, and science teachers communicated that content-expertise gives more clout to the feedback offered. Combined with the results of prior research, the results of this study seem to indicate that there is a need for more administrators with science backgrounds in the instructional leadership realm. However, if there is a science instructional leader in every building, then there are additional content areas that will become underrepresented. Perhaps the answer is not to recruit more science experts into leadership positions, but to provide science training to those who are already there. Johnson (2017) found that providing content-focused professional development to administrators over the span of a year significantly increased administrator self-efficacy in the field of mathematics, leading to more powerful
conversations about teaching and learning. If there is agreement that teachers are the most important influence on student achievement, it makes sense to spend more time working on developing teacher skills and strategies in a purposeful manner, and not just to check a box off of a list of things to do. To accomplish this goal, we need to provide instructional leaders with the tools they need to make a difference in the classrooms that they are expected to supervise.

Administrator participants in the current study shared that they make do as best they can when they are not experts in the content that they are evaluating, with some discussing the importance of collaboration between colleagues within the content. One administrator in particular discussed using his background and experience in other content areas to apply to the science classroom.

Having been an English and Physical Education teacher, I feel that I am very effective at identifying ways to engage students in the content through collaborative work and problem solving. Additionally, after conducting many classroom observations and informal walkthroughs of classes of all disciplines, I feel that I have a pretty good idea of instructional practices that work in classrooms and how they might be implemented. (Administrator 2)

Both Lochmiller (2016) and Meadows (2015) also found that administrators without science expertise would draw upon their teaching experiences in other content areas to provide guidance to teachers. Once again, we see examples of administrators who would say that good teaching is good teaching, regardless of the content, with no consideration for the complexities of the science classroom. I have to wonder if this is a situation where non-science expert administrators just do not have the awareness of how a science
classroom is best taught and that there are nuances that do not exist in other content areas. In short, they don’t know what they don’t know. Science methods classes in teacher education programs are taught by science-specific instructors in the context of the content, not the pedagogy. The reasoning behind this is because pedagogy with regards to a laboratory-based setting is not the equivalent to pedagogy as it relates to a lecture setting. Labs that are inquiry-based will ideally involve science teachers releasing students to explore concepts and phenomena on their own. To an outside observer, this release of teacher control does not always appear contained and regulated. Does this lead to observations and evaluations by non-expert administrators that are more negative in nature because of the lack of understanding about how exploration in a science classroom operates? After all, Nelson and Sassi (2000) found that administrators with no content expertise rated video-recordings of math teachers as exhibiting less than stellar instruction before receiving training in the ways of student exploration with math. After becoming learners of the content, administrators did not even comment on the perceived problem areas noted before the professional training was completed. This research showed that the basic understandings of student learning were impacted by the experience of administrators in the content area. Do these negative evaluations become more common with the Nebraska College and Career Ready Standards for Science, where teachers are asked to move even further away from the traditional way that science has been taught? Is the backlash I received upon discussing my dissertation topic a sign that there are quite a few administrators out there who are unaware of their inexperience when it comes to science instruction in a classroom?
There is much research in the literature that has recognized the importance of content connection with feedback offered (Burch & Spillane, 2003; Feeney, 2007; Grossman & Stodolsky, 1994; 1995; Khachatryan, 2015; Spillane, 2005; Stein & Nelson, 2003). As Stein and Nelson (2003) discuss with their idea of nested learning communities, the content does not or should not become less important as you move away from the classroom setting. However, if content is ignored for the sake of classroom management and other pedagogically-related focuses of feedback, then we lose the power of both Leadership Content Knowledge (LCK) and Pedagogical Content Knowledge (PCK) as it pertains to working with students and teachers within the context of the content (Figure 3). And then, as so succinctly stated by Stein and Nelson (2003), “Without knowledge that connects subject matter, learning, and teaching to acts of leadership, leadership floats disconnected from the very process it is designed to govern” (p. 446). When the content area is not at the heart of the teaching and learning as seen with the removal of Circle 1 in Figure 3, conversations between administrators and content teachers look differently. The focus of feedback conversations that are still happening in Circle 3 have only one thing left to focus on and that is the relationship between the teacher and the students in Circle 2. Hence, the end result of purely pedagogical feedback focused on teacher-student relationships and classroom management, as many science teachers and administrators shared in the responses collected during the current study. The results of this study show that, although science teachers do not always mind receiving content-neutral feedback, there is also a recognition by both science teacher and administrator participants that science-specific feedback and leadership connected to content is important for professional growth.
Figure 3. Modification of nested learning communities with subject matter removed (Adapted from Stein & Nelson, 2003, p. 425).

Feeney (2007) discussed the importance of administrator feedback connecting to the content because the teachers are directly using that feedback to make decisions about how to teach within the context of their content. My study results show that while many science teachers were interested in receiving content-specific feedback, content engagement was not essential for the feedback to be perceived as purposeful. It is tough to know whether this is because of a true need for content-neutral feedback related to classroom management and student relationships, or because of the existing culture of the way things are currently done. Have enough secondary science teachers experienced
quality content-specific feedback to be able to communicate a need for such feedback or even a concept of what that would be like? Only four of 26 (15.38%) science teachers from this study cited specific science-related feedback that was received through the feedback process. Would science teachers recognize a greater need for content-specific supports if they had been exposed to what those supports could look like and do to push their teaching and learning forward in the context of the science content? If a culture existed in which administrators were capable of providing content-related feedback in a science classroom, what would self-efficacy levels of administrators and professional growth and satisfaction of science teachers look like? Wise, et al. (1985) discuss teaching as a continuum, with greater needs for feedback connected to pedagogy for beginning teachers, combined with a transition into content specializations as teachers progress in their knowledge and capacity of teaching. As teaching careers progress, administrators offering evaluative feedback must be able to progress alongside, or at the very least, be capable of talking the talk. The results of this study indicated that science teachers were not expecting administrators to be able to do this based on their prior experiences with receiving feedback. However, science teacher participants communicated that they were interested in receiving content-specific feedback and administrators were willing to admit to weaknesses in this area. Without more administrator trainings in content areas, how we will ever get past the culture of “satisfactory” identified so prevalently in the literature (e.g., Donaldson, 2009; Toch & Rothman, 2008; Weisberg, et al., 2009)?

A dearth still exists in the literature concerning how the process of instructional leadership can support science teachers through reform efforts (Lochmiller, 2015; Lochmiller & Acker-Hocevar, 2016; Lochmiller, Huggins, & Acker-Hocevar, 2012;
Theoharis & Brooks, 2012). The current study did not do much to fill these gaps, with resulting participant responses to TEES-F and ASES-S item references to the Nebraska College and Career Ready Standards for Science. Neither science teachers nor administrators participating in this study were equipped with much information on how changes in the standards were going to be implemented or what feedback might look like to support science teachers in making reform efforts. As we traverse down this new road of teaching science in a new way, science teachers will need even more support if they are expected to make this transition successfully. Administrator competence in science content will help to strengthen supports present for this reform effort that might be deemed as intimidating or unattainable for adults who struggle with change.

Many concluding statements that I have made throughout this section have repeatedly revisited the idea of more extensive training for our instructional leaders. However, literature would indicate that this training does not only need to be focused in science content, but perhaps in instructional leadership in general. Weisberg, et al. (2009) found that 73% of administrators responsible for teacher evaluation and the provision of feedback to educators had anywhere from somewhat limited to no training at all with regard to instructional leadership skill sets. In retrospect, I wish I would have asked about the amount of training the administrators participating in the current study had undergone. If the goal of teacher evaluation and feedback is not only for accountability, but for instructional improvement, then it would make sense to invest more in the training of our instructional leaders. Why would we not provide our school leaders with as many skills as possible? In addition, if Grissom, et al. (2013) are accurate in their assessment of the time that administrators are able to spend on instructional leadership tasks (12.7%),
then there is a real need to maximize the small amount of time that is available for administrators to work with their building teachers.

Literature has recognized the importance of an increased focus on the classroom teacher if education systems and instructional components are to keep improving (Goodwin, 2010; Wise, et al., 1985; Wright, et al., 1997), but can we do that focus justice if we ignore the importance of content? Twenty-four percent of science teacher participants from the current study stated that the teacher evaluation process did not help to make them a better teacher in the classroom. As Grossman and Stodolsky (1994; 1995) observe, secondary teachers identify with their content through department associations, professional organizations, professional development, and even with their learning during methods courses in teacher preparation programs. While elementary teachers may introduce themselves as specific grade-level teachers, a secondary content specialist is not a ninth grade teacher, but rather a science teacher. That being said, how can we separate content from the feedback process, an entity whose purpose is to offer both accountability and professional growth to the teachers it supports? Furthermore, what do student achievement scores look like in an educational system where teachers are supported based on the specific content that they teach? Do science scores for students in the state of Nebraska show improvement from their middle-of-the-pack performance as compared to other states within the United States (The Nation’s Report Card, 2015)?

Despite the often negative views of teacher evaluation in the literature (e.g. Donaldson, 2009; Marshall, 2015; Weisberg, et al., 2009), 60% of science teacher participants in this study claimed the feedback process helped make them better classroom teachers. The results of this study indicate that evaluating administrators could
benefit by more exposure to science-specific instructional leadership skills in a professional development capacity. The results of this study agree with previous research (Louis, et al., 2010) that suggests that secondary administrators are in need of more instructional leadership supports to supplement their knowledge in the more specialized and complex high school setting. Building both knowledge and skills relating to science content would enable a more confident and competent feedback practice, as viewed by both science teachers and administrators. This increase in content exposure might involve greater administrative presence in science classrooms in a learning capacity or attendance at professional development workshops alongside science teachers, as suggested by various literature sources (Halverson, et al., 2011; Nelson & Sassi, 2007; Stein & Nelson, 2003; Theoharis & Brooks, 2012). After all, the only way I can gain more confidence when working with a mechanic is to learn about how my car and its functioning parts work together or engage in vocabulary-laden conversations with my mechanic in an attempt to understand why certain indicators lead to specific courses of action. In taking these initiatives to learn more, I can at least become competent in my understanding of responses and reactions, and capable of holding my own in a conversation if I still cannot claim expertise on the matter. The same is true in a science classroom. There are certain conceptual challenges that administrators can only understand by increasing exposure and initiating related conversations. Both science teachers and administrators can learn from each other in this regard. As aptly stated by Stein and Nelson (2003), “learning is spurred by asymmetries in expertise” (p. 426). Carefully posed questions by administrators might lead to more reflection by science teachers about the reasoning behind certain curriculum or strategy choices. Quality feedback from administrators to secondary teachers within
the science content would ideally result in greater teacher growth and student achievement in the areas of science education.

**Suggestions for Future Research**

Some findings from this study remained elusive in terms of explanation and that is where I would start my suggestions for future research. For example, science teachers were shown to incorporate content-neutral feedback from administrators into their teaching significantly more often than that of content-specific, regardless of the expertise of the source. This finding is supported by results of Lochmiller (2016) who found that science teachers often cited content-neutral feedback when asked to provide an example of prior feedback that had been helpful to them. There are also studies in the literature that have shown content experts to be lacking in pedagogical expertise (Donder, 2011; Torff & Sessions, 2005, 2009), which might explain the greater propensity for readily adopting content-neutral suggestions for change. A clarification of the reasoning behind these findings would be purposeful to explore. Are science teachers only citing content-neutral feedback examples because that is primarily what they have been provided or is their perceived area of improvement in pedagogy?

Additional results from this study indicate a link between teacher evaluation satisfaction and interest in professional development and growth. What is not clear is whether satisfaction with feedback received from teacher evaluation is responsible for the decrease in professional development interest or whether little interest in professional development opportunities leads to perceptions of higher satisfaction with teacher evaluation and feedback received. Similarly, does an inclination for professional growth lead to lower satisfaction levels with feedback from evaluating administrators or does a
lower level of satisfaction from feedback lead to the search for outside professional development and growth opportunities? Personal reflection would lead me to believe that lower teacher evaluation satisfaction levels result in more interest in outside professional development resources. Reddy, et al. (2017) discovered a similar connection to professional development, but found that feedback was the driving force for professional development and growth in the classroom. Further research could pinpoint which arose first and caused the other. In addition, science teachers are divided on their satisfaction with the teacher evaluation and feedback process. Lochmiller (2016) and Meadows (2015) showed similar results in their studies of science teacher perceptions for growth. Clearly, this is an area that needs to be examined in more detail.

Additional areas for future research might examine those items listed in the delimitations for this study. For example, teacher and administrator perceptions collected from this study might not apply to schools and districts who employ specialized instructional coaches in their staff. Instructional coaches, as is the purpose of their position, may provide focused, content-specific feedback in working with teachers that is not applicable to the level of administrator feedback. To begin, it would be purposeful to see how content-specific feedback from an instructional or even a peer coach, as preferred by some science teachers from this study, compared to that of an evaluating administrator, as well as how frequently feedback suggestions from such entities were incorporated into classroom teaching strategies.

The results from this study were focused on a single content area at the secondary education level, and it is not clear whether data collected in this study will be generalizable to other content specialties as well as varying levels of education. To be
honest, it would be a bit hypocritical of me to assume otherwise. Taking a journey down these various avenues would be purposeful to explore. Finally, data was collected in this study from science teachers and administrators across Nebraska from solitary Class A high schools within each of the four chosen districts. The size of the high school, the number of science teachers and administrators, and the fact that there are no other high schools within each district to collaborate with might affect teacher and administrator mindsets as it pertains to professional growth in the classroom. All of these extraneous influences would be purposeful to separate out in an attempt to gauge impact.

Summary

The results of this study have shown that, in general, secondary science teachers want feedback from their evaluating administrators. Contrary to my initial expectations that specialist teachers would have a preference for content-specific feedback, the participants of this study showed more interest in content-neutral, pedagogically-related feedback, although the reasoning behind this interest is not yet clear. As a whole, secondary science teachers prefer to receive both content-neutral and content-specific feedback from administrators they view as competent of providing such feedback. Secondary administrators were seen as overwhelmingly capable of providing quality feedback in a content-neutral setting, but both science teachers and administrators recognized weakness with the provision of science-specific instructional supports. These results call for additional professional development for administrators with regards to the provision of specialized content feedback. It is not yet clear what format those supports need to take on, whether administrators need more content-related professional development trainings and preparation, or if science-focused instructional coaching and
peer feedback need to become more prevalent in secondary settings. However, in light of proposed budget cuts already affecting such specialist positions within a participating school district, is it wise to rely on such resources to always be a presence? This definitely should not be the choice made at the expense of building administrator expertise. Perhaps the answer is a combination of all of these personnel resources to improve the quality of feedback provided to secondary science teachers. In addition, this study illustrated a need for the provision of more specific feedback connected to professional development opportunities. In light of the Nebraska College and Career Ready Standards for Science coming in the spring of 2018, the timing is right for providing more science-specific supports to both secondary science teachers and their evaluating administrators.
References


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*Educational Leadership, 70*, 3, 10-13.


*Nursing Research, 40*(1), 120-123.


doi:10.1257/aer.102.7.3628…p.96


Appendices
Appendix A. University of Nebraska IRB approval letter

November 10, 2017

Megan Myers, MS
Education
UNO - VIA COURIER

IRB # 008-17-EX

TITLE OF PROPOSAL: NEBRASKA EDUCATOR PERCEPTIONS OF RECEIVING AND PROVIDING QUALITY FEEDBACK IN A SECONDARY SCIENCE CLASSROOM

The Office of Regulatory Affairs (ORA) has reviewed your application for Exempt Educational, Behavioral, and Social Science Research on the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46.101b, category 2. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable HRPP Policies. It is also understood that the ORA will be immediately notified of any proposed changes for your research project.

Please be advised that this research has a maximum approval period of 5 years from the original date of approval and release.

If the research is completed prior to 5 years, please notify the Office of Regulatory Affairs at lthora@unmc.edu. If this study continues beyond the five year approval period, the project must be resubmitted in order to maintain an active approval status.

Sincerely,

Signed on: 2017-11-10 13:04:00.000

Gail Koltulak, BS, CIP
IRB Administrator III
Office of Regulatory Affairs
Appendix B. Teacher Evaluation Experience Scale-Feedback (TEES-F)
Teacher Evaluation Experience Scale—Feedback (TEES-F)

-IRB# 698-17-EX (adapted from Coleman, 1992; Lochmiller, 2016; Reddy, Dudek, Kettler, Kurz, & Peters, 2016)

Thank you for agreeing to participate in this survey and support the completion of my doctoral research. The data collected will help inform me of the type of feedback necessary to help science teachers grow professionally in a secondary setting.

The Teacher Evaluation Experience Scale-Feedback asks you to evaluate your experiences with receiving performance feedback by your administrator evaluator.

Consent to Participate in Survey

The following survey will take approximately 20 minutes to complete. There will be no compensation nor any risk involved with the completion of the survey. Survey data will be kept completely confidential, and, for that reason, I ask you to please not list any names of people or schools that might be recognizable. Please answer these questions honestly and complete this survey as promptly as your schedule permits. The completion of this survey is voluntary and you are under no obligation to answer every question. The researcher reserves the right to contact survey participants to ask follow-up questions about open-ended responses if necessary. If you would like additional information from the researcher, please contact Megan Myers at mmyers@epsne.org or at (402) 578-2797. If you are not satisfied with the study or the manner in which it is being conducted, please contact Dr. Kay Keiser, the department chair of Educational Leadership, at kkeiser@unomaha.edu or at (402) 554-3443.

By clicking NEXT, you indicate your willingness to participate in this survey.
Demographics of Participants:

1. Gender
   a. Male
   b. Female
   c. Decline to respond
2. Number of years (including this school year) in current school district
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +
3. Number of years as a classroom teacher
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +
4. Please specify your content certification area.

5. Describe your previous experience with teacher evaluation systems. How many districts and schools have you experienced? How many different evaluators?

6. Do you actively seek out professional development opportunities?

Teacher Evaluation Experience Scale-Feedback (TEES-F)

You are asked to read the following statements and rate your most recent experiences with each item. These items should be answered from your perspective as a teacher working with a current administrator in a teacher evaluation capacity. Such a system is designed to produce an effective teaching and learning environment. You are to indicate the degree to which you agree or disagree with each statement by choosing the appropriate scale value.
<table>
<thead>
<tr>
<th>Scale</th>
<th>1=Strongly Disagree (SD)</th>
<th>2=Disagree (D)</th>
<th>3=Neutral (N)</th>
<th>4=Agree (A)</th>
<th>5=Strongly Agree (SA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluation feedback was received.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Evaluation feedback was useful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Evaluation feedback was specific.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Evaluation feedback suggested specific changes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Evaluation feedback helped improve general instructional effectiveness.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Evaluation feedback helped improve content-specific instructional effectiveness.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Evaluation feedback was aligned with pedagogy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Evaluation feedback was aligned with course taught.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Evaluation feedback provided information for PD opportunities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Evaluator appeared competent to evaluate content-neutral teaching performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Evaluator was able to offer effective content-neutral teaching strategies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Evaluator appeared competent to evaluate content-specific teaching performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Evaluator was able to offer effective content-specific teaching strategies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14 a. Content-neutral feedback was received from a non-content expert administrator.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14 b. Feedback was incorporated into teaching.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15 a. Content-specific feedback was received from a non-content expert administrator.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15 b. Feedback was incorporated into teaching.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
16 a. Content-neutral feedback was received from a content expert administrator.  
16 b. Feedback was incorporated into teaching.  
17 a. Content-specific feedback was received from a content expert administrator.  
17 b. Feedback was incorporated into teaching.  
18. Feedback process increased teacher(s) motivation to change classroom practice.  
19. Teacher evaluation system provided PD opportunities that motivated teacher(s) to change classroom practice(s).  
20. Satisfied with the evaluation feedback.  

<table>
<thead>
<tr>
<th>Open-ended questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Does the evaluation and/or feedback process make you a better teacher?</td>
</tr>
<tr>
<td>a. If so, in what ways? If not, why not?</td>
</tr>
<tr>
<td>22. Was your evaluator formerly a science teacher?</td>
</tr>
<tr>
<td>a. How do you think this influences the type of feedback offered to you and your colleagues?</td>
</tr>
<tr>
<td>b. How do you think this influences your interest in the feedback provided?</td>
</tr>
<tr>
<td>23. What does feedback typically focus on?</td>
</tr>
<tr>
<td>a. Can you give a specific example of an administrator providing you with feedback related to your content area?</td>
</tr>
<tr>
<td>b. How was this feedback similar to or different from other feedback you receive?</td>
</tr>
<tr>
<td>c. Can you give a specific example of an administrator providing you with feedback unrelated to your content area?</td>
</tr>
<tr>
<td>d. Which was more helpful? Why?</td>
</tr>
<tr>
<td>24. How would you respond to receiving content-neutral feedback? Please elaborate.</td>
</tr>
<tr>
<td>25. How would you respond to receiving content-specific feedback? Please elaborate.</td>
</tr>
</tbody>
</table>
26. What type of feedback do you need to grow as a science teacher? Please explain.

27. Can your evaluator provide that feedback? Please explain.

28. As a Nebraska teacher, are you aware of the Nebraska College and Career Ready Standards for Science being incorporated in the spring of 2018?
   a. Have you received any information on how to implement instructional changes in your classroom?
   b. What supports will you require to implement these changes successfully?
Appendix C. Administrator Self-Efficacy Scale for Science (ASES-S)
Administrator’s Self-Efficacy Survey-Science (ASES-S)-IRB# 698-17-EX

(Adapted from Johnson, 2017; Lochmiller, 2016; Lochmiller & Acker-Hocevar, 2016; Smith & Guarino, 2005)

Thank you for agreeing to participate in this survey and support the completion of my doctoral research. The data collected will help inform the type of feedback necessary to help science teachers grow professionally in a secondary setting.

The Administrator’s Self-Efficacy Survey-Science instrument asks you to evaluate your abilities to provide performance feedback to secondary science teachers.

Consent to Participate in Survey

The following survey will take approximately 20 minutes to complete. There will be no compensation nor any risk involved in the completion of the survey. Survey data will be kept completely confidential, and, for that reason, I ask you to please not list any names of people or schools that might be recognizable. Please answer these questions honestly and complete this survey as promptly as your schedule permits. The completion of this survey is voluntary and you are under no obligation to answer every question. The researcher reserves the right to contact survey participants to ask follow-up questions about open-ended responses if necessary. If you would like additional information from the researcher, please contact Megan Myers at mmyers@epsne.org or at (402) 578-2797. If you are not satisfied with the study or the manner in which it is being conducted, please contact Dr. Kay Keiser, the department chair of Educational Leadership, at kkeiser@unomaha.edu or at (402) 554-3443.

By clicking NEXT, you indicate your willingness to participate in this survey.
Demographics of Participants:

1. Gender
   a. Male
   b. Female
   c. Decline to respond

2. Number of years in current school district
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +

3. Current position or job title
   a. Head Principal
   b. Assistant Principal
   c. Principal Intern

4. Number of years in current position
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +

5. Number of years in administration
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +

6. Number of years as a classroom teacher
   a. 1-5 years
   b. 6-10 years
   c. 11-15 years
   d. 15-20 years
   e. 21-25 years
   f. 26 years +

7. Describe your previous experience as a classroom teacher. In what content area(s) were you mostly assigned? Please specify your area of content certification.
Content-Specific Knowledge & Skills

8. Please rank order the following subject-areas (1-Most Confident to 5-Least Confident) based on your level of personal comfort with your knowledge and skills in the content found in a secondary setting. Mark only one oval per row.

<table>
<thead>
<tr>
<th>Most Confident (1)</th>
<th>(2)</th>
<th>Neutral (3)</th>
<th>(4)</th>
<th>Least Confident (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing/Language Arts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Administrator Self-Efficacy Survey

You are asked to read the following items and rate the strength of your beliefs in your abilities to attain the following outcomes. These items should be answered from your perspective as a school administrator/instructional leader working to produce an effective teaching and learning environment. You are to indicate the degree to which you agree or disagree with each statement by choosing the appropriate scale value.

Scale: 1=Strongly Disagree (SD)
       2=Disagree (D)
       3=Neutral (N)
       4=Agree (A)
       5=Strongly Agree (SA)

<table>
<thead>
<tr>
<th>1. I am able to regularly perform effective observations of teachers.</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. I am able to stay abreast of current best practices for facilitating effective teaching and learning.</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. I am able to provide experiences that foster and facilitate high levels of teacher motivation towards teaching and learning.</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tr>
<tr>
<td>4. I am able to provide feedback regarding effective teaching and learning practices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I am able to engage in rich conversations with teachers following instructional observations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I am able to lead observation debriefing conversations with teachers on how students learn.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I am able to encourage teachers to reflect upon their knowledge, skills, and dispositions regarding effective teaching and learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I am able to recognize errors or misconceptions within a teacher’s instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I am able to discuss the rationale behind curriculum and instruction reform.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I am able to regularly perform effective observations of instruction by science teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I am able to stay abreast of current best practices for facilitating effective science teaching and learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I am able to provide experiences that foster and facilitate high levels of teacher motivation towards the teaching and learning of science.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I am able to provide feedback using consistent language regarding effective science teaching and learning practices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. I am able to engage in rich, science-related conversations with teachers following instructional observations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. I am able to lead observation debriefing conversations with teachers on how students learn science.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. I am able to encourage teachers to scientifically reflect upon their knowledge, skills, and dispositions regarding effective science teaching and learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. I am able to recognize science-based errors or misconceptions within a teacher’s instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
18. I am able to discuss the rationale behind science-based curriculum and instruction reform.

| 1 | 2 | 3 | 4 | 5 |

**Open-Ended Questions:**

19. What feedback do you provide to classroom teachers after completing an observation? What do you focus on?

20. How does your content area of expertise influence and shape your leadership actions?

21. What words come to mind when you hear “Effective Science Instruction”?

22. What type of feedback do you think science teachers need to grow professionally? Please elaborate.
   
a. Can you provide that feedback? Please explain.

23. As a Nebraska administrator, are you aware of the Nebraska College and Career Ready Standards for Science being incorporated in the spring of 2018?
   
a. Have you received any information on how to implement changes in your building?

b. Have you received any information on how to address these changes with feedback provided to science teachers through evaluation?