MAKING YOUR OWN ROLE: EXPLORING INSTRUCTIONAL LEADERSHIP PRACTICE OF HIGH SCHOOL SCIENCE DEPARTMENT CHAIRS

by

JEREMY SCOTT PEACOCK

(Under the Direction of Norman Thomson)

ABSTRACT

As science teachers major reforms in curriculum, instruction, and assessment, leaders at all levels must provide leadership and support that allows teachers to implement a new vision for science education within a challenging social, political, and economic climate. High school department chairs hold prime position to provide such leadership, but this role is under-researched and under-used within schools. Lack of time and authority and role conflict and ambiguity limit chairs' effectiveness. Instructional leadership practice of science chairs represents a gap in the literature. Therefore, the purpose of this dissertation was to add to this limited understanding. Chapter 1 introduces the problem and lays out the theoretical framework, which draws on symbolic interactionism, narrative analysis, and Grounded Theory. Chapter 2 presents a review of historical literature on department chairs—along with reviews of literature on instructional leadership, science education leadership, and modeling within education research—and then concludes with a literature-based model of science instructional leadership. The remaining chapters present the empirical findings from three distinct phases of research and analysis.

Chapter 3 presents the results of a descriptive survey of instructional leadership practices among science chairs across Georgia. Survey findings underscored the value of providing chairs with sufficient time and support to complete instructional duties. Further, a model developed from survey data provides a roadmap of how chairs build on supports and negotiate limitations to enact leadership within schools. Chapter 4 develops a comparative approach to narrative positioning analysis and presents findings from interviews with 11 exemplary science chairs and self-interviews with the author. Chairs' leadership

practice was strongly shaped by their school context and particularly by their positioning within the school leadership hierarchy. Chapter 5 builds on the previous analysis to develop a conceptual model of chairs' instructional leadership practice that is jointly grounded in empirical data and existing literature. This analysis revealed that chairs more often positioned their practice within a discourse of school improvement than science education. Chapter 6 draws overarching conclusions and implications from this dissertation. Two important implications are that principals can manipulate the school leadership structure to empower chairs' as instructional leaders and that chairs must act to educate teachers and administrators regarding the vision for science education reforms.

INDEX WORDS: Department chairs, Instructional leadership, Science education, High school, Survey, Symbolic interactionism, Narrative analysis, Positioning theory, Constant comparative method, Grounded conceptual model

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JEREMY SCOTT PEACOCK

B.S.E.H., The University of Georgia, 1999

M.Ed., The University of Georgia, 2009

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JEREMY SCOTT PEACOCK

Major Professor:	Norman Thomson
Committee:	Kathleen deMarrais David Jackson Sally Zepeda

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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DEDICATION

I dedicate this work to my mother, Jeanne, and my grandfather, Lewis, who were my role models in life; to my daughter, Isabel, who I hope looks up to me in the same way; to my wife, Amy, who is my partner in this endeavor and in life; and to the rest of my family, who has always supported and believed in me.

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CHAPTER 1

INTRODUCTION

Constructing Instructional Leadership Identity Through Narrative

At the time of our second interview, Keith Shaw (a pseudonym) had completed his twelfth year teaching high school science and his second year as the science department chair at a high school in rural Northeast Georgia. After an earlier interview focusing on Shaw's general role as chair, I conducted the follow-up interview with the goal of focusing specifically on his role in instructional leadership within his department. Keith was still a novice chair but was reflective and conscientious in this role. Keith perceived the following barriers to his leadership role as a chair in his school and school district: (1) lack of line authority, (2) poor communication within the school, (3) budgetary constraints, and (4) exclusion from school decision-making. Within these constraints, Keith attempted to construct his leadership role with the goal of promoting continuous improvement in his department.

I used a Labovian (Labov, 1972; Labov & Waletzky, 1967/1997) to construct the following narrative based on the transcript of my second interview with Keith, and I present it here as evidence of the value of chairs' narratives of professional practice in understanding how those chairs enact instructional leadership. Labov and Waletzky concluded that personal narratives comprise six types of clauses (i.e. abstract, orientation, complicating action, evaluation, and resolution), with each serving a specific function within the narratives. Particularly, evaluations most directly reveal the meaning that the narrator attaches to a narrative. Following the narrative, I present a brief discussion of my analytical methods and highlight the major themes in Keith's narrative of instructional leadership.

Constructed Narrative

1. Abstract: Instructional leadership as constructive criticism
I kind of think of instructional leadership in terms of what I can do.
You know I don't have choices over curriculum or standards, and I'm finding that I don't have a lot of choices on materials that we own or buy, because that's limited by money, which we don't have.

So, the only thing that I can really figure out over the past couple years that I really have some control over with instructional leadership is just trying to offer suggestions and criticism—positive or negative, I guess more positive than negative—to teachers that I see might be struggling with a concept or an idea or an action, offering advice on decision-making on a few things.

2. Orientation: A struggling teacher
So if we're strictly focusing on instructional leadership, I have a teacher in my department that has struggled with some aspects of instruction in their classroom, some bad reviews on some classroom observations by an administrator and things like that.
Well, I taught with this individual for a few years at a couple of different schools, so I know them very well, and I was well aware of their weaknesses.
They don't have an education background.
It was an alternative program teacher, which isn't necessarily a bad thing.
So I was aware.

3. Complicating action: A bad review
This year they received an observation with NIs [Needs Improvement] on it, a lot of NIs.
So it just all of a sudden hit the fan, so to speak.
So, you know, I've got two choices.
So anyway, no one has asked me to, to help or step in or anything.

4. Evaluation: Lack of support for struggling teachers
And really it is just a case where the administrators have neglected really telling this person the truth for three or four years and finally somebody did.
And really the thing about education that bugs me, and I don't necessarily have a good fix for it yet, but you know we don't really focus on teachers that aren't doing a great job to help make them better.
We either just ignore them so they keep being bad and just affecting all the kids they teach or we just get rid of them, which neither one of those really helps them.
Like I said, that's a fault of our, how the whole thing is set up, when someone's not good, they just pound them on, on a GTOI [Georgia Teacher Observation Instrument], they put them on a PDP [Professional Development Plan], and they do what they can to get rid of them.
So, you know, like I said, we just kind of push teachers out if they're not good.
Really we're not even good at pushing them out if they're not good.
That's another whole problem that they usually just stay here.

5. Evaluation: I feel for them
I mean this person is in my department and I could just, which I think a lot of people do this, just let them keep doing what they always do and let somebody else worry about it, let the administration worry about it completely.
I just feel like I should, partly in this case, partly because I'm the department head, but I mean, honestly a big part of it isn't just that, it's that I've taught with this person for five years now, and so, you know, I don't want to say that I'm friends with this person.
We don't really talk outside of school.
We definitely have a relationship, I mean, you know, and so I feel for them.

6. Complicating action: Trying to step up
So, I'm trying to, I guess, kind of, step up and help this particular person.
Not that I'm an expert in any means, but I've had more years of teaching than this person.
I just use that and try to come up with some strategies and classroom procedures to help them out.

7. Complicating action: Communicating with administration
Now with that, I have been in a lot of contact with the assistant principal that was overseeing the science department, basically, where that stemmed from, the assistant principal that gave the NIs, I've been in a lot of contact with him, so I've had a lot more direction with that.
But in all honesty, it's not really been asked of me at all.
So, I've had a lot of contact with that administrator, and he's in complete agreement with what I'm doing.
He hasn't asked me to do it, but I try to run everything past them just to be sure it goes up the chain.
They don't really ask for it, but I think that's important.

8. Evaluation: Improving the department
So that's really been my focus for instructional leadership, and that really doesn't involve everyone.
I mean, granted, you bring up one person in your department, you bring up the whole department. I see this as a whole, but I'm really trying as much as I can to help and put some time into this person.
It's still tough, because I'm still dealing with all my, you know it's not like we have extra time for that, so I find that is hard to balance.

9. Evaluation: Accepting the criticism
This person, I will say, their strong point is they have a huge willingness to accept some criticism and try to make it better, and that's really the saving grace here.
I mean, most teachers don't have, are not very willing, they just fly off the handle and everything goes down hill from there.
But this person's been very, very actively seeking help.
I know they really want to be doing this. I've had teachers that don't care.
That's the key in this case.
This person has made it obvious that they are accepting the criticism.
They did not blow up on anyone, which our administrator is very impressed with, they come seeking help, so it's a different case.
A lot of poor teachers just don't do that.
They don't think they're bad at it.
If you tell them otherwise, they're just going to yell at you, and they'll find a new school to teach in, so this is a unique case.

10. Complicating action: Places to improve
So, you know, I took some time to meet with them and give my opinion of what I've seen from them over the past few years, just teacher to teacher, and then try to offer places to improve, you know, actual places that would be successful, trying to pick out certain things rather than looking.

11. Evaluation: Where to start
Because teaching is so, I mean, just saying you're a good teacher is such a broad, there's so many variables that go into being a good teacher that it's overwhelming if you're not, if somebody tells you you're not a good teacher.
You know, where do you even start?

12. Complicating action: Focus on classroom management
So, I just tried to pick out a few things where they can start like classroom management is a simple idea.

13. Evaluation: Foundation for good teaching
It's not simple to enforce, necessarily, but it's somewhere to start. And I think classroom management is a good foundation for good teaching.
I don't really think you can be a great teacher and have horrible classroom management, because your kids aren't learning; they have no academic learning time if they're not paying attention.

So we're starting there, and we saw good improvements towards the end of this year in that aspect, so that's something I'm going to keep pushing with them into next year.

14. Complicating action: Focus on pacing
And I've started to focus on, with this particular individual, another weakness was pacing, staying on track.
They get behind so fast, and by the end of the semester, they'll be three weeks behind where they should be, then you're not, you're just not teaching part of it.
And so, that's really going to be my focus for next year.

15. Orientation: Starting in the middle
It's hard to just start that in the middle.
It really all just happened in the second, in the last quarter of this semester.

16. Complicating action: Plans for next year
So, I'm going to focus on that next year.
I'm going to meet with them during preplanning.
I've been teaching them how I go through pacing, like how I print the standards, print out a calendar, and literally, you know, just mark the calendar when I want to start and end each unit.
And I've been stressing to them not to get too detailed with that, because if you get too detailed with it, if you go day-by-day, and some people can do this, but if you're not used to doing this, by day three, you'll be off, and then you just get frustrated, you just scrap the whole thing.

17. Resolution: Tangible goals
And so, you know, I'm trying to stay, I'm trying to choose tangible goals that I think are doable for this person, one step at a time.

18. Evaluation: A long process
I mean, it's going to be a long process, but there's no, you don't just suddenly become a good teacher. You have to learn all these things and, why this person hasn't learned all these things confuses me (laughter), because part of me, you know, is the type where I just like, oh just let them figure it out for themselves and if they can't do it they don't need to be in the field, but then part of me wonders if that's where we falter as an educational system, you know, when we have someone that's not good, we don't really do anything to help them, in all honesty.
We just push them off to the next county, and somebody else has got to deal with them.

19. Coda: Trying to tackle this
So anyway, so that's how I've been trying to tackle this, this situation, this individual.

20. Epilogue: Making your own leadership role
Do I see myself an instructional leader?
More and more…our county doesn't give a lot of leadership to department heads, so you've got to kind of make your own leadership role.
With this particular situation that we just discussed with this teacher with some NIs on their report, that's really been the influx of my instructional leadership, so to speak.

Discussion of Narrative

I modeled my narrative analysis after Johnson's (2009) study of an Australian principal's construction of a leadership identity through two interview narratives. Johnson (2009) took a multi-

layered approach that began by using Labovian (Labov, 1972; Labov & Waletzky, 1967/1997) analysis to identify narrative elements (i.e. abstract, orientation, complicating action, evaluation, resolution, and code) for analysis within a larger interview and to organize characters and actions into a "recognisable plot" (p. 272). On top of this structural analysis, Johnson (2009) layered Bamberg's (1997, 2003, 2005) positioning analysis. According to Johnson (2009), positioning analysis provided an "empirically-grounded" (p. 270) method to analyze "identities persons construct for themselves as they engage in storytelling" (p. 270). In this view, people actively construct identities through narratives rather than simply reporting pre-existing identities. In her analysis of the principal's narrative, Johnson (2009) detailed how the principal actively narrated her position and identity first as a strong manager and later as a "pedagogical" (p. 280) leader in a distributed leadership model. Johnson's (2009) third layer of analysis drew on conversation analysis "to demonstrate how the storyteller…and the interviewer position each other as particular kinds of identities" (p. 275).

Johnson (2009) argued that narrative functions "in not only recollecting the past, but in constituting the future" (p. 271). In Johnson's (2009) example, "the act of storytelling allows the principal to generate extensive knowledge in collaboration with a listener/interviewer about what it means to be a principal who strives to facilitate change under somewhat difficult circumstances" (pp. 271-272). Therefore, this approach to narrative inquiry has the potential to generate important professional knowledge (Baker & Johnson, 1998) on the role of high school science chairs as instructional leaders.

While I followed Johnson's (2009) approach in analyzing Keith Shaw's narrative, I did make two departures from her analytical approach. Firstly, I made a significant departure from Johnson's (2009) reliance on conversation analysis and attention to turn-taking. I did not find that Johnson's attention to turn-taking produced significant insights beyond the structural and positional analyses. In addition, my reordering of passages to follow the temporal progress of the narrative disrupted the turn-taking that occurred during the interview. Secondly in addition to Labov's (Labov, 1972; Labov & Waletzky, 1967/1997) six narrative elements, I identified an epilogue that provides a larger context for my analysis of this narrative.

Once I had constructed the narrative shown above, I conducted a positioning analysis by reviewing each narrative passage with two questions in mind: (1) How does the chair position himself in relation to other characters or events in the narrative? and (2) How do these shifting positions allow the chair to generate professional knowledge and construct a particular identity? Fourth, I related these smaller-level analyses to larger themes from the literature on high school chairs. In the abstract (Passage 1) of the narrative, Keith positions himself as a chair trying to enact instructional leadership in the face of a range of institutional limitations. Keith concludes he has "some control" over providing constructive criticism to teachers within his department. In passages 2 and 3, Keith implicitly contrasts himself with the struggling teacher. The struggling teacher does not "have an education background" and is in need of considerable support to improve in the classroom.

In passage 4, Keith begins a dual position that carries through the narrative. Keith on one hand positions himself as part of the educational establishment and responsible for supporting struggling teachers but on the other hand separates himself from his school administrators and their evaluative functions. Consistent with the literature on role conflict and ambiguity in the chair role, Keith finds himself in an ambiguous position between teacher and administrator. In passage 5, Keith describes the decision before him: to pass all responsibility for the struggling teacher to the school administration or to "step up" and take responsibility as the chair and as a supportive colleague. In passages 6 and 7, Keith positions himself in the latter position, i.e. going beyond administrative expectations to support the struggling teacher.

At the same time, Keith maintains the administrative hierarchy through frequent communications with his assistant principal. Keith downplays his instructional expertise but justifies his ability to help the struggling teacher based on Keith's longer tenure as a teacher. In passage 8, Keith makes the claim that helping the struggling teacher improve will improve his department, overall. Keith also highlights his need to balance support for the struggling teacher with other teaching and departmental responsibilities. In passage 9, Keith positions the struggling teacher as someone who is willing to accept criticism and who "really want[s] to be doing this." The struggling teacher's positive attitude provides motivation for

Keith's intervention. In passage 10, Keith positions himself as a colleague offering advice "teacher to teacher," rather than as a superior providing directives. However in passages 11 through 17, Keith positions himself as someone who is both knowledgeable about the complex endeavor of being a good teacher and able to monitor the struggling teacher's progress toward this goal by setting specific goals.

Passage 18 provides the most direct support of Johnson's (2009) claim that "identities are works in progress," as Keith portrays his transition from an isolated practitioner to a collegial leader who is responsible for supporting a struggling teacher. Keith further elaborates on his developing identity as an instructional leader in the epilogue. Keith has realized he must "make [his] own leadership role," and his instructional leader identity is emerging within this role. Keith's narrative puts a human face on the ambiguous and negotiated nature of the chair position.

Keith's actions in supporting the struggling teacher had value independent of his narration and my subsequent analysis. Keith was actively negotiating his role as a science chair and constructing an identity as an instructional leader through his interactions with the struggling teacher and with school administrators. However, the narration and narrative analysis serve functions that may reap benefits well beyond mentoring a single teacher. For Keith, the narration provides a space to reflect upon his practice and to actively construct his identity as an instructional leader. For practitioners and researchers interested in the role of science chairs in instructional leadership, this type of narrative inquiry can generate new educational knowledge as Johnson (2009) argues. This knowledge can be used to question and improve current practice and to inform new research, leadership reforms, and professional development. Thus, this single narrative from a novice science chair begins to paint a picture of what it means to enact instructional leadership within the constraints routinely faced by chairs. Therefore, analyzing and comparing multiple narratives from a sample of experienced and exemplary science chairs will provide the empirical grounding needed to move from simply confirming the existing literature on chairs to generating a new theoretical understanding of the nature of instructional leadership as it is enacted by high school science chairs.

Statement of the Problem

With science teachers still striving to meet the goals of the National Science Education Standards (National Research Council [NRC], 1996), a consortium of educators and policy makers has recently released the Next Generation Science Standards with the goal of clarifying the vision for science education by focusing learning on fewer core concepts, providing a progression of concepts to support student learning, and emphasizing the roles of scientific inquiry and engineering design. Against the backdrop of this ongoing national standards movement, the state, local, and school-level context for science education is constantly shifting in response to political and social pressures, economic realities, student needs, and education research findings. To provide science teachers with any hope of surviving and thriving in this complex and fluid environment, science education leaders must provide ongoing support and guidance. At the secondary level, teachers strongly identify with the academic department as the unit "which organizes teachers spatially, temporally, administratively, and symbolically" (Siskin, 1994). As leaders of these organizational units, science chairs represent an important resource for facilitating the implementation of science education reforms and the continuous improvement of teaching and learning. Unfortunately the leadership capacity of science chairs is not well understood, and chairs have been underused as a resource for improving instruction and student learning (Weller, 2001).

As will be shown in the literature review below, authors in educational leadership have discussed and researched the role of the high school chair for more than 100 years. Across this time span, authors have repeatedly argued that high school chairs are in prime position to supplement the principal's leadership within high schools and to support the improvement of instruction. However for the same time span, authors have reported that chairs' ability to provide such leadership is limited by lack of line authority, limited time, role conflict, and role ambiguity. Yet the literature and practical experience indicate that chairs can exert a positive and important influence on instruction and learning within high school academic departments.

Purpose and Research Questions

The purpose of this research was to understand and inform the professional practice of high school science department chairs in the role of instructional leadership. The following research questions guided my investigation of the instructional leadership role of high school science department chairs.

1. How do high school science department chairs in Georgia enact the role of instructional leadership?
2. How do exemplary high school science department chairs position themselves as instructional leaders through their narratives of professional practice?
3. How can department chairs' narratives and existing literature inform the construction of a conceptual model of science instructional leadership?

I conducted two distinct phases of research to address these questions. First, I conducted a survey study of the instructional leadership practice of high school science department chairs in Georgia. Second, I conducted a narrative interview study with exemplary science department chairs who are able to overcome the many barriers to act as effective instructional leaders within their departments. I conducted two main layers of analysis on the data generated through the interview study. Narrative positioning analysis highlighted the contextual and diverse nature of chairs' practice, while construction of a grounded conceptual model revealed the core features present across the participants' narratives.

Theoretical Framework

The theoretical or conceptual framework of a study provides the intellectual foundation for a research design (Mason, 2002; Maxwell, 2005; Miles & Huberman, 1994) and lays the groundwork for research that is "systematically and rigorously conducted" as suggested by Mason (2002, p. 7). Maxwell (2005) defined the conceptual framework as "the actual ideas and beliefs that you hold about the phenomenon studied, whether these are written down or not" (p. 33). Further, he argued that this framework represents a conception, model, or "*tentative* theory of the phenomena that you are investigating" (Maxwell, 2005, p. 33, italics in original). This model informs the research design, provides criteria for researcher decisions, aligns the study to established research paradigms, and helps the

researcher justify the research and identify threats to its validity (Maxwell, 2005). The conceptual framework is constructed from experiential knowledge, existing literature, exploratory research, and speculative thinking (Maxwell, 2005).

Mason (2002) delineated the conceptual framework by posing five questions that illicit the researcher's ontological perspective on the nature of the phenomena to be studied, epistemological perspective on what represents evidence of these phenomena, broad area of research interest, the type of intellectual puzzle the researcher wishes to solve and the resulting research questions, and the aims and purpose of the research. Mason's (2002) notion of intellectual puzzle addressed the "intellectual and theoretical contributions" (p. 17) of the work and coincided with some kind of explanation or argument, rather than a mere description. Thus, the research problem, purpose, research questions, literature review, research paradigms, and methodological perspectives are all part of the conceptual framework for my study. While the entirety of my conceptual framework is laid out throughout this dissertation, the current section explores how I align myself with the research paradigms of symbolic interactionism, narrative analysis, and grounded theory.

Symbolic Interactionism

While many science chairs work under the guidelines of official school district job descriptions, the literature makes clear that there is great variety in the actual duties carried out by chairs even within a single school district. The literature also makes clear that science chairs depend heavily on relationship management and interpersonal skills to enact leadership within their departments and schools. These chairs, like all school professionals, must constantly respond to a range of stakeholders who may hold incongruous expectations. The actual role of a science chair is constantly negotiated through social interactions among these stakeholders and the chair. Thus, symbolic interactionism provides a useful perspective for understanding these negotiations between science chairs and various stakeholders.

The interactionist perspective holds that reality is constructed and meaning is made through human interactions and communications that rely on collectively defined symbols (Blumer, 1969; Prasad, 2005). As the name implies, symbolic interactionism maintains a joint focus on meaning making and the

interaction of individuals (Prasad, 2005). The meanings created through social interactions "are not completely predetermined but are constantly being modified through a series of individual interpretations" (Prasad, 2005, p. 21). This interaction relies on "mutual role-taking" (Blumer, 1969, p. 10) in which each actor must take the role of the other to fully understand the meaning of the other's actions and to ensure effective communication.

This perspective is an excellent fit for studying the complex social negotiations involved in executing the instructional leadership role of the science chair. Each communication between a chair and a teacher, administrator, or other stakeholder represents a negotiation of what it means for a science chair to be an instructional leader. Similarly, Spillane (2006) held that leadership occurs in the interactions between a leader and others rather than simply in the actions of the leader. In adopting a symbolic interactionist framework, I aimed to explore how the meaning of being a science instructional leader is constructed through interactions among these science chairs and the various stakeholders they serve.

Interactionist methodology. Blumer (1969) indicated that interactionist research involves a "direct examination of the empirical social world" (p. 47) through techniques such as interviews, participant observation, and document analysis. Researchers should seek to understand human behavior in everyday social settings, but researchers need a keen familiarity with a particular social setting to make a reasonable attempt to capture the true meanings held by individuals in that setting. This is accomplished in two phases. The exploration phase involves immersion of the researcher in the social world to be studied. During the inspection phase, the researcher systematically analyzes the data that has been generated. Blumer implored researchers to "respect the nature of the empirical world and organize a methodological stance to reflect that respect" (p. 60). For Blumer, the nature of the empirical world was reflected in the root images that undergird symbolic interactionism.

As Prasad (2005) explained, symbolic interactionist research enters the everyday worlds of individuals and seeks to understand these worlds from the perspectives of those individuals through participant observation and interviews. These methods are often described as ethnography, although there is less focus on culture and more on the individual than in anthropological ethnography. Symbolic

interactionist interviews are in-depth processes that focus on how individuals make meaning of and create self-identities in social situations. Data analysis is open-ended and inductive, developing theoretical explanations on the basis of particular research findings rather than seeking to confirm pre-established assumptions.

Narrative Analysis

The literature on chairs and instructional leadership is littered with long lists of knowledge, skills, and dispositions suggested for or observed in effective educational leaders. These lists, however, quickly lose appeal in providing meaningful understanding of or informing leadership practice. As Robinson (2010) argued, a "practical endeavor such as school leadership involves a seamless and dynamic integration of knowledge, skills, and personal qualities" (p. 3) within the complex social environment of a school. A quote borrowed from Paley's (1990) discussion of the use of storytelling in preschool teaching, provided an excellent summary of the value of narrative in studying a professional practice such as science instructional leadership: "None of us are to be found in sets of tasks or lists of attributes; we can be known only in the unfolding of our unique stories within the context of everyday events" (p. xii). Further, Davis (2003) argued that narrative inquiry, by highlighting "contextual particularities and individual agency" (p. vii), provides an important counter vision to the dominant rhetoric in school reform. Rather than drawing idealized generalizations from large samples of data, narrative studies can give educators the opportunity to "think away from" (Davis, 2003, p. viii) particular narratives to imagine how these stories might inform their own practice in their own context. Thus, I propose that a narrative approach is most appropriate to understand and inform the professional practice of science department chairs in instructional leadership.

Bruner (1986) suggested that narrative is one of two modes of human thought or "ways of ordering experience, of constructing reality" (p. 11). For Bruner (1986), the narrative mode of thought answered the "question of how we come to endow experience with meaning" (p. 12). Likewise, Polkinghorne (1988) argued that narrative is "the primary form by which human experience is made

meaningful" (p. 1). For Polkinghorne (1988), this meaning is produced through "a cognitive process that organizes human experience into temporally meaningful episodes" (p. 1).

While scholars have provided a wide range of interpretations of the term "narrative," Polkinghorne (1988) provided the following useful model of narrative.

- Plot – "The organizing theme that identifies the significance and the role of the individual events is normally called the 'plot' of the narrative" (p. 18).
- Explanation – "An event is understood to have been explained when its role and significance in relation to a human project is identified" (p. 21).
- Communication – Narrative presentation involves three kinds of communication: "the presentation of the original story to personal awareness," "the representation of the experience in a language message to others," and "the reception—including interpretation and understanding—of a story by hearing or reading" (pp. 21-22).

In Polkinghorne's (1998) model, "narrative is always controlled by the concept of time and by the recognition that temporality is the primary dimension of human existence" (p. 20). The goal of research into narrative meaning is to "produce clear and accurate descriptions" of the meaning "that individuals and groups can use to increase the power and control they have over their own actions" (Polkinghorne, 1988, p. 10).

Just as the term "narrative" has been interpreted in many ways, narrative analysis is an intellectually and methodologically diverse field. As Riessman (2008) stated, narratives cannot "speak for themselves" (p. 3) and cannot provide a direct view of the narrator's thoughts, intentions, or meanings. Rather, narratives are co-constructed, transcribed, represented, and interpreted. Each of these processes is influenced by the researcher's background, beliefs, and objectives. The particular approach to narrative analysis that I employed for my research on science instructional leadership represents one of many possible approaches.

As discussed earlier in this chapter, I drew inspiration for my approach to narrative analysis from Johnson's (2009) study of an Australian principal's construction of a leadership identity through

interview narratives. Johnson (2009) took a multi-layered approach that combined Labovian structural analysis (Labov, 1972; Labov & Waletzky, 1967/1997), positioning analysis (Bamberg, 1997, 2003, 2005), and the conception of interview talk as professional practice (Baker & Johnson, 1998). Given the importance of these three perspectives to my narrative analysis approach, I will provide brief summary of each concept in the following sections. I will also briefly address Gee's (2012) concepts of discourse analysis, which underlay my selected approach to narrative analysis.

Labovian structural analysis. In a work originally published in 1967, Labov and Waletzky (1967/1997) set out to analyze "the simplest and most fundamental narrative structures" (p. 3), which they argued were to be found in "oral versions of personal experience" (p. 3). In this analysis, Labov and Waletzky (1967/1997) hoped to isolate the formal elements of narrative and to relate these elements to their functions. Labov and Waletzky (1967/1997) defined narrative "as one verbal technique for recapitulating experience—in particular, a technique of constructing narrative units that match the *temporal sequence* of that experience" (p. 4, italics in original). These authors pointed out, though, that narrative rarely serves only this function of recapitulation; in addition, narratives serve an evaluative function related to personal interest (Labov and Waletzky, 1967/1997). After analyzing a set of narratives collected in response to the prompt, "Were you ever in a situation where you thought you were in serious danger of getting killed?" (p. 5), Labov and Waletzky (1967/1997) identified three types of clauses in these narratives. Narrative clauses maintain the strict temporal order of the narrative, and their position in the narrative cannot be modified without altering the meaning of the narrative. Restricted clauses may be moved within a limited range within the narrative without altering meaning. Free clauses may occur anywhere throughout a narrative without altering its meaning. Labov and Waletzky (1967/1997) then derived a framework of narrative functions within which these clauses could be classified, and Labov (1972) slightly modified this framework in his study of Black English vernacular. According to this framework (Labov 1972; Labov & Waletzky, 1967/1997), a narrative clause may serve one of the following six functions.

- Abstract – Summarizes what the story is about
- Orientation – Identifies the time, place, persons, and situation
- Complicating action – Describes the series of events that comprise the narrative
- Evaluation – "reveals the attitude of the narrator towards the narrative by emphasizing the relative importance of some narrative units as compared to others" (Labov & Waletzky, 1967/1997, p. 32)
- Resolution – Describes the result of the narrative
- Coda – Signals that the narrative is finished

While some scholars (e.g., Mishler, 1986) have criticized Labov's approach for failing to account for the interactional nature of interview narratives, this approach provided a well-recognized, systematic method for identifying key structural elements in my research narratives.

Positioning analysis. Bamberg (1997) combined the Labovian approach to structural analysis with Davies and Harré's (1990) concept of discursive positioning in an attempt to unite structural analysis of narrative with a pragmatic approach that addressed "the discursive situation and the discursive purpose" (Bamberg, 1997, p. 341) of the narrative. This approach recognized that narratives serve multiple purposes and addressed Mishler's (1986) criticism that Labov's approach fails to address the interpersonal function of narratives. Bamberg's (1997) approach was built on the joint ideas that narratives are "representations of something that once happened and what this past happening" means to the narrator and that "the act of telling…intervene[s]…between the actual experience and the story" (p. 335). Thus, narratives "are co-constructed in interactive settings, and their main function is to reveal how what is said…ought to be understood" (Bamberg, 2004, p. 133).

In order to make sense of the interactive construction of a narrative, Bamberg applied the concept of positioning, which Davies and Harré (1990) defined as "the discursive process whereby selves are located in conversation as observably and subjectively coherent participants in jointly produced story lines" (p. 48). Thus, individuals produce a discursive identity as they narrate and position themselves

within a story. Bamberg (1997) formulated three levels of positioning, defined by the following questions, respectively.

1. "How are the characters positioned in relation to one another within the reported events?" (p. 337)
2. "How does the speaker position him- or herself to the audience?" (p. 337)
3. "How do narrators position themselves to themselves?" (p. 337)

Bamberg (2003) concluded that positioning analysis is "an empirically grounded analysis of how subjects construct themselves by analyzing the positions that are actively and agentively taken in their narratives vis-à-vis normative discourses" (p. 153). Compared to a purely Labovian approach, Bamberg's positioning approach broadens the definition of narrative and the applicability of the analysis beyond the oral personal narratives that were Labov's original focus (Bamberg, 1997, 2003).

Gee's (2012) notion of discourse analysis is closely related to positioning analysis and to the concept, discussed below, of interview talk as professional practice. Gee (2012) distinguished two levels of discourse. Gee's higher level Discourse (with a capital "D") "is composed of distinctive ways of speaking/listening" and interacting that "enact specific socially recognizable identities engaged in specific socially recognizable activities" (p. 152). Discourses determine how a person gets "recognized as a given kind of person at a specific time and place" (Gee, 2012, p. 152). Gee (2012) explained that the lower-level discourse (with a lower-case "d") refers to "stretches of language which 'hang together' so as to make sense to some community of people" (p. 113) and is a part of Discourse. Together these concepts connect language situated within a specific narrative with larger social and institutional narratives.

Interview talk as professional practice. A goal of in-depth narrative interviews related to professional practice is to lead interviewees to reflect on their prior actions and to create meaning for these actions through a co-constructed narrative. Baker and Johnson (1998) suggested that interview talk could move beyond reflection on practice to the generation of new professional knowledge. This perspective is based on a situated view of language in which language is "seen as a resource for describing states and assembling social realities in particular, setting- and listener-relevant ways" (Baker

& Johnson, 1998, p. 230). This suggests that "the activities of interviewing be analysed as interactional events in the social world which in themselves provide telling evidence of how people make sense of each other and what resources they use to do this" (Baker & Johnson, 1998, p. 230). Baker and Johnson's (1998) suggested that interviewers encourage and attend to accounting—the process in which interviewees "offer or imply reasons, justifications, motivations, and outcomes" (p. 231) of their actions—as a sense-making technique during and in the analysis of interviews. This attention to accounting "allows the interview talk…to be understood as 'culture in action'" (Baker & Johnson, 1998, p. 231) and therefore as the practice of professional knowledge. Further, Baker and Johnson (1998) proposed that researchers should "treat interview talk as social action in that such talk can reshape practice" (p. 239) with the goal of improving professional practice in education.

Grounded Theory

Although I did not conduct a classical grounded theory investigation, I did borrow some key techniques from grounded theory methods. Therefore, an understanding of grounded theory forms an important part of the conceptual framework for my study. Originally put forward by Glaser and Strauss (1967), the grounded theory approach provides a means to generate theory that is intimately linked to empirical data and that provides "relevant predictions, explanations, interpretations and applications" (p. 1) related to social interactions and processes. Charmaz (2006) characterized grounded theory methods as "systematic, yet flexible guidelines for collecting and analyzing data to construct theories 'grounded' in the data themselves" (p. 2). This approach, based in symbolic interactionism, is well suited for studying everyday social interactions and processes at a level beyond the single individual (Charmaz, 2006).

Rather than attempting to apply existing theory developed based on a priori logic, grounded theorists seek from the beginning of a study to generate theory through constant comparisons within and across data sets (Charmaz, 2006; Glaser & Strauss, 1967). Thus data generation and data analysis occur simultaneously. The comparison of data and generation of theory is facilitated through theoretical sampling, in which the researcher intentionally shifts the focus of data generation throughout the study to better address theoretical questions that arise during comparative analysis. This iterative process of

analyzing and theorizing is documented and carried out through memo writing. Coding, i.e. attaching "labels to segments of data that depict what each segment is about" (Charmaz, p. 3), provides the direct link from the data to the conceptual categories that constitute the grounded theory. Through successive rounds of coding, analysis, memo writing, and theoretical sampling, the researcher raises categories to increasing levels of abstraction while maintaining a strong connection to the empirical data.

According to Glaser and Strauss (1967), grounded theorists should seek to construct theory that is understandable both to social scientists and to laypersons in the area of the research and that is useful within the area studied. To accomplish this, the theory must "fit the situation being researched, and work when put into use" (Glaser & Strauss, 1967, p. 3). Glaser and Strauss (1967) argued that a theory fits when the categories are "readily (not forcibly) applicable to and indicated by the data under study" (p. 3) and that a theory works when it is "meaningfully relevant to and…able to explain the behavior under study" (p. 3). This approach produces theory that is durable and that is intimately connected to the data rather than being added on to the end of a descriptive analysis; it also avoids propping up a logically deduced theory with selective examples. Although a grounded theory is durable, it is modifiable with new data. However, new data is unlikely to negate the original theory.

A grounded theory consists of categories, properties of those categories, and hypotheses regarding the relationships among those categories (Glaser & Strauss, 1967). All these components and the integration of these into a coherent theory should be grounded in the data, and this theory can be presented in a variety of ways. Such theory may represent formal theory related to a conceptual area of sociology or substantive theory related to an empirical area of study, as was the goal of the present study. Substantive theory is generated directly from empirical data, while formal theory may be generated by comparing the findings of many empirical studies (Glaser & Strauss, 1967)

Glaser and Strauss (1967) laid out four stages—comparing incidents applicable to each category, integrating categories and their properties, delimiting theory, and writing theory—that "allow, with discipline, for some of the vagueness and flexibility that aid in creative generation of theory" (p. 103). The practice of the constant comparative method centers on studying and comparing data through

successive levels of coding and writing memos to "define ideas that best fit and interpret the data" (Charmaz, 2006, p. 3). This comparative analysis "involves the systematic choice and study of several comparison groups" (Glaser & Strauss, 1967, p. 9); these groups can represent social units of any size. As a researcher moves from comparison within one data source to comparisons across data sources, the researcher raises these interpretive ideas toward the goal of developing "an abstract theoretical understanding of the studied experience" (Charmaz, 2006, p. 4), or a grounded theory. As mentioned above, the comparisons of data are organized through coding processes that begin with an initial coding that maintains a close connection to the data (Charmaz, 2006). The researcher then moves through additional coding phases that become increasingly more theoretical until the researcher has identified conceptual categories that will form the framework of the grounded theory. The properties and relationships among these categories are explicated in analytical memos, and the process is supported through theoretical sampling that ensures that sufficiently rich data are generated to fully define each conceptual category (Charmaz, 2006).

While the constant comparative approach provided a practical means to generate theory from the narratives generated as part of this study, it was equally important that the epistemological foundation of grounded theory was consistent with the overall theoretical framework of the study. Grounded theory draws both on Glaser's positivist, systematic approach to research and on Strauss' pragmatist perspective on social interactions (Charmaz, 2006). Glaser contributed "dispassionate empiricism, rigorous codified methods,…[and] emphasis on emergent discoveries" (Charmaz, 2006, p. 7). Strauss brought to grounded theory the pragmatist philosophy that underlies symbolic interactionism and views individuals as active agents and social processes and meanings as constructed through language and interaction (Charmaz, 2006). The combination of these perspectives led to a systematic and rigorous approach to generate theory related to how people create and modify meaning through interactions and social processes.

Researcher's Subjectivities

At the time of writing this, I have recently completed my seventh year as a high school science teacher and my fourth year as a science chair. I take both roles very seriously. As a teacher, I work to

give my students the best possible opportunity to learn. As a chair, I try to act as a mentor, supporter, role model, and collaborator to the teachers in my department. I constantly reflect on ways to improve my practice to enhance student learning in my own classroom and in all science classes at my school. This constant search for improvement led to my interest in conducting research on the role of high school science chairs. Although a number of research articles and professional books focus on this topic, they do not provide a research base to answer the question of what it takes on a daily basis to be an effective science chair, particularly in regard to instructional leadership. I hope my research has partially filled this gap, and I am confident that is will help me become a better chair and instructional leader as I move forward in my career.

My interactions with various chairs during my teaching career led me to the idea that there are three general types of science chairs. The first is a neutral conduit between teachers and administrators. This chair handles the required paperwork, passes directives from administrators to teachers, and communicates teacher concerns back to administrators. This chair neither helps nor hinders the instructional work of the school and department. The second type of chair is a negative force in the school. This leader resists change, undermines administrative authority, is condescending or bullying toward other teachers, or defends teachers' interests without regard for the students' best interests. The third type of chair, and the ideal to which I aspire, is a positive force in the school. This chair is an innovative and inspirational leader whose actions and decisions are aimed at maximizing student learning. This leader is knowledgeable in educational practice and motivates other teachers to improve.

As a current chair, I value the positive influence a chair can have on student learning, and I am personally focused on maximizing my effectiveness in my own role as an instructional leader. Even so, I worked to maintain an open perspective as I generated and analyze data to ensure my openness to all relevant research directions. My role as a chair also gave me insider status and contributed to my rapport with my participants. However, this status made it easy to fall into using jargon and allowing unspoken meanings to stand. I tried to be mindful of this limitation throughout my project, and I made efforts during my interviews to explore taken-for-granted or unspoken meanings. My own personal

demographics as a white, middle-class, college-educated professional were similar to my participants. Therefore, it is important to keep in mind that my study represents one limited perspective on what it means to be a science chair. While I was not able to generate a more diverse pool of participants, I understand that diverse voices would add to the richness and meaning of my work.

My own subjectivities have evolved during this project as I have followed political developments surrounding education reform in the United State. While massive threats to public education, such as privatization and continued over-reliance on high-stakes testing, swirl in American society and policy, this dissertation takes a microscopic view from within the massive and complex educational system. This study aligns with the idea that science education can be improved by improving classroom practice and that science teachers and that department chairs can support such improvement. However, that idea does not come from a view that poor teaching is the only, or the primary, challenge facing public education. Rather, I see poverty and inequity as the great challenges in America public education. However, this study allowed me to explore how I can improve my practice as a science education leader. The wider reading I have done about America public education is prompting me to think deeply about how I, professionally and personally, can support the larger movement to address the real challenges—poverty, inequity, privatization, and political demonization—that face American public schools.

Assumptions

As a result of my professional experience, literature study, and pilot work for this study, I developed a number of assumptions that guided this study. The following assumptions influenced my decisions at all stages of this project.

1. The chair's position is characterized by role ambiguity and role conflict.
2. The chair's role is constantly negotiated through everyday social interactions with school stakeholders.
3. While instructional leadership is widely discussed as a goal of high school chairs, structural barriers greatly limit chairs' ability to enact this leadership.

4. Chairs identified as exemplary in this study were able to overcome or work within the structural constraints discussed above to enact leadership that supported instructional improvement within their departments.
5. Instructional leadership is a complex, multifaceted process that emerges from interactions among school administrators, chairs, teachers, students, and other school stakeholders.
6. Chairs' narratives of professional practice provided a rich and valuable source of data from which to build a conceptual model of chairs' instructional leadership.

Definition of Terms

While the true meaning of terms such as instructional leadership are negotiated through everyday social interactions, it is useful to specify the researcher's understanding of several terms that are used throughout this dissertation.

1. High School Department Chair – The term department chair (chair) is used to refer to any school leader who is associated with an academic subject department and who is not part of the senior administration of the school. In various times and contexts, these leaders have been referred to as department heads, heads of department, subject leaders, middle managers, or as a subset of teacher leaders. This study focused exclusively on chairs in high schools, which generally encompass grades 9 through 12.
2. Instructional Leadership – Any efforts taken by the chair to influence teachers' instructional decision making and practices with the goal of improving student learning in science.
3. Exemplary – This describes chairs who are able to work within or overcome structural barriers to enact leadership that supports instructional improvement within their departments.
4. Conceptual Model – A visual representation of a theory, including important concepts that comprise the theory and relationships among those concepts.

Significance of the Study

In my view, education research is truly significant only when the research contributes both to our theoretical understanding of the process of education and to the everyday practice of education. Thus, I attempted to select a research focus and to design a study that allowed my work to meet both these criteria. This study contributes to the limited theoretical understanding of instructional leadership as enacted by high school science chairs and informs the professional practice of such chairs.

Theoretical Significance

An extensive review of the literature on high school chairs pointed to the untapped potential of chairs to act as instructional leaders, but a number of important gaps remain in this literature. Several studies (Skinner, 2007; Willis, 2010; Zepeda & Kruskamp, 2007; de Lima, 2008; Ritchie, Mackay, & Rigano, 2005) indicated the need to move beyond the strict application of role theory to explore chair leadership in terms of the social interactions through which chairs enact it. A few researchers (Au, Wright, & Botton, 2003; Bolam & Turner, 2003; Wettersten, 1993,1994) proposed conceptual models describing the work of the high school chair, but this area of research is underdeveloped. Related to research methodology, O'Neill (2000) suggested over a decade ago that narrative methods offered an ideal tool to understand and enhance chairs' work; unfortunately, few researchers have taken up this suggestion. Generally, research on the specific role of chairs as instructional leaders is inadequate, and the perspectives of science chairs, specifically, are not well represented.

Practical Significance

Research articles regularly cite a lack of professional learning for chairs, and publications aimed at practitioners are limited in availability and lack focus on the instructional aspect of the position. Similar to many research articles, practitioner books for high school chairs often provide long lists of knowledge, skills, and dispositions that individuals need to be successful in the position. These lists are not easily translated into the daily social interactions that comprise the chair role. In addition, many practitioner publications provide practical guidance and sample forms for accomplishing many of the managerial tasks that are required of the position. However, these publications lack a primary focus on

instruction. It is hoped that the conceptual model developed through this study provides not a how-to guide but a point of departure for reflection and for the generation of professional knowledge that will inform and enhance the professional practice of high school science chairs.

Organization of the Dissertation

The current chapter has illustrated the value of chairs' narratives of instructional leadership and laid out the purpose, research questions, and theoretical framework that guided this study. The chapter also explicated my subjectivities and assumptions and argued for the theoretical and practical significance of the study. The following chapter presents an exhaustive historical review of more than a century's worth of literature on the high school chair. The chapter also reviews relevant literature on instructional leadership, science education leadership, and model building in education research.

The three subsequent chapters present manuscript-style reports on the major phases of this project. Chapter 3 addresses Research Question 1 by presenting the findings of a descriptive survey that targeted all public high school science department chairs in the state of Georgia. The results of this survey provide a descriptive backdrop for the narrative interview study and highlight the challenges faced by chairs, as well as the practices they employ in their attempts to overcome these challenges. Chapter 4 attends to Research Question 2 by detailing the methods and findings of my narrative positioning analysis of interviews with 11 exemplary science chairs, in addition to self-interviews by the author. This close analysis foregrounds the effect that chairs' school contexts had on their leadership practice and emphasizes the diversity that existed in that practice. Chapter 5 presents a grounded conceptual model that provides an answer to Research Question 3. The model raises the level of abstraction of the positioning analysis in order to bring the commonalities of chairs' practice into focus. Finally, chapter 6 outlines general conclusions and directions for future work. As a whole, this dissertation enhances our understanding of the instructional leadership practice of high school science department chairs and highlights the critical role these professionals can play in supporting ongoing curriculum and instructional reforms in science education.

CHAPTER 2

REVIEW OF LITERATURE

A research-based answer to the question of how science chairs can effectively act as instructional leaders for the teachers in their departments represents a gap in the science education literature. This chapter explores the historical and contemporary contexts of this question with the goal of informing professional practice and education research. As a goal of this study is to develop a conceptual model of science department chair instructional leadership, this chapter also reviews the development, use, and evaluation of models in education research. This literature reviewed in this chapter provided a broad backdrop for my study, but I continued to search and read the literature throughout my study and especially as I sought to link the findings of my grounded conceptual model to existing research. Therefore, the most relevant, and in some cases more recent, work is briefly reviewed within each article presented in chapters 3 though 5.

I have framed the question of science department chair instructional leadership within three distinct discourses on leadership. The first discourse comprises the historical literature, dating to 1910, on the nature of the chair position. The second is the instructional leadership discourse that grew out the effective schools movement of the 1970s and 1980s and which is associated primarily with the school principal (Hallinger, 2005). The third discourse focuses on curriculum and teaching leadership in science education and is exemplified by the recent volume, *Science Education Leadership: Best Practices for the New Century*, edited by Jack Rhoton (2010). Below, I trace the historical contexts and summarize current understandings of each of these discourses. I also attempt to synthesize these discourses to draw out implications for the practice of science chairs as instructional leaders and to propose directions for future research. Based on this synthesis, I present a preliminary conceptual model of instructional leadership for high school science chairs.

The High School Department Chair

This section reviews available English-language empirical research on high school academic chairs from 1910 through the present. For the time span from 1960 through 2013, I did not include literature reviews, position papers, or other non-empirical publications. However, I only located three empirical studies published before 1960. Therefore for the period from 1910 through 1959, I included publications that were not based on empirical research. These publications included first-hand reports, essays, and position papers from chairs, principals, and professors of education. In total, I reviewed 109 publications including journal articles, book chapters, doctoral dissertations, conference papers, and ERIC research reports. Table 2.1 summarizes the number of each type of publication reviewed by time period.

After locating the publications for my review, I analyzed each to identify the research topic, research purpose, theoretical framework, methods, participants, key findings, and implications. Based on this analysis, I identified eight general topics addressed by the publications in this review. Table 2.2 lists these topics and the number of publications categorized under each topic. Table 2.3 displays a breakdown of studies by time period, research topic, and type of research (i.e. quantitative, qualitative, or mixed methods). For studies published before 1960, the Mixed/Other category includes non-empirical publications.

The remainder of this review is organized as follows. In the following section, I provide a brief historical background of the chair position, and I discuss the early academic writings on the high school chair including publications through 1959. With this foundation in place, I organize my review of the research from 1960 through 2010 around the research topics identified in Table 2.2. Finally, I discuss major themes and gaps in the literature before situating my own proposed research within the literature on high school chairs.

Table 2.1

Summary of Publications Reviewed on the Secondary Department Chair, 1910-2010

	Number of publications by period					
Publication type	1910-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2010
Journal Article or Book Chapter	16	5[a]	1	7	13	22
Doctoral Dissertation	0	0	0	9[b]	8	12[c]
Conference Paper or ERIC Report	0	1	4	3	8	0
Total	16	6	5	19	29	34

Note. The publications noted report multiple studies or represent pairs of dissertations and published journal articles.

[a] Manlove and Buser (1966) reports the results of three doctoral dissertations that are not included in this count.

[b]Mansfield's (1983) dissertation was published as Kottkamp and Mansfield (1985); Brown's (1988) dissertation was published as Worner and Brown (1993)

[c]Mayers' (2001) dissertation was published as Mayers and Zepeda (2002); Kruskamp's (2003) dissertation was published as Zepeda and Kruskamp (2007)

Table 2.2

Summary of Topics in Secondary Department Chair Studies, 1910-2010

Topic	Number
Roles & responsibilities	50
Instructional leadership	17
Leadership practice	13
School change	11
Distributed leadership	9
Subject context	3
Principal relationship	1
School climate	1
Total	105

Table 2.3

Type of Research and Research Topic for Department Chair Studies, 1910-2010

	Type of study and topic (number of studies)		
Time period	Quantitative	Qualitative	Mixed/Other
1910-1959	Roles & responsibilities (3)		Roles & responsibilities (9) Instructional leadership (2) Leadership practice (2)
1960-1969	Roles & responsibilities (5) Instructional leadership (1)		
1970-1979	Roles & responsibilities (5)		
1980-1989	Roles & responsibilities (7) Instructional leadership (3) Leadership practice (1) School climate (1)	School change (3) Principal relationship (1) Roles & responsibilities (1)	Instructional leadership (1)
1990-1999	Roles & responsibilities (5) Leadership practice (1)	Distributed leadership (4) Roles & responsibilities (3) School change (3) Instructional leadership (2) Leadership practice (2) Subject context (1)	Roles & responsibilities (3) Instructional leadership (1) Leadership practice (1) School change (1) Subject context (1)
2000-2010	Roles & responsibilities (5) Leadership practice (3) Distributed leadership (1) Instructional leadership (1)	Instructional leadership (6) Distributed leadership (4) Roles & responsibilities (4) School change (4) Leadership practice (3) Subject context (1)	

History of the Department Chair Role

Early writings (1910-1959). The first high school in the United States was founded in Boston in 1821, and high schools were widespread in the country by the 1920s (Spring, 2008). By 1910, high schools in urban areas were growing beyond the size at which a single principal could successfully administer these schools (Meriwether, 1910; Fenske, 1997). In 1906, Congress legislated the creation of eight subject departments within each of the high schools of Washington, D.C. (Meriwether, 1910). According to Meriwether (1910), chairs of these departments "were to act as educational advisors to the principals" (p. 276), but early enactment of these roles led to "ambiguities and inconsistencies" (p. 276).

Early on, chairs were asked to carry out a wide range of duties, and the early academic writings on the high school chair focused on defining this multifaceted role. Chairs at Theodore Roosevelt High School in Alton, Illinois, in the 1920s were expected to aid in the organization and efficiency of the department, to hold department meetings, to assist in textbook adoption, and to maintain familiarity with the latest instructional resources relevant to the subjects in the department (Richardson, 1920). Supervision of teachers was assigned exclusively to the principal, and curriculum matters were assigned to a head assistant for curriculum. Principal Armand Miller (1922) reported a similar organization at McKinley High School in St. Louis.

Heinmiller (1921), an education professor in Pennsylvania, proposed that the chair and principal shared a "dual responsibility" (p. 149) for pedagogy, supervision, and administration in relation to the department. According to Heinmiller, the proportions of these responsibilities varied, with the principal having the main responsibility for administration and the chair having the main responsibility for pedagogy; supervision was shared evenly. Heinmiller described a long list of specific duties, including supervising instruction, managing curriculum and assessment, assigning teachers to courses, selecting and obtaining textbooks and equipment, coordinating remediation, correlating work among departments, holding department meetings, handling discipline for the department, trying new innovations in teaching, and assisting the principal in administrative duties.

Franklin Johnson (1925) of Columbia University argued that chairs "offer the most available and most promising source from which to draw the needed reinforcement" (p. 524) to help accomplish the administrative and supervisory duties required of principals in growing high schools. To provide this administrative support, Johnson suggested chairs would need to be freed from some of their teaching duties. Specialized content and pedagogical knowledge and close interactions with department teachers made chairs ideal candidates for supervision and improvement of teachers; however, Johnson found that methods of selection and practices of chairs fell short of these ideals. Johnson provided the following list of duties as a guide to principals and practicing chairs: consulting with the principal on school policies, communicating policies to department members, informing the principal of "progress and needs" (p. 526) of the department, consulting on the selection of new teachers, managing departmental resources and records, coordinating extracurricular activities, and supervising instruction.

Brodell (1927) provided very specific guidance for new science chairs by publishing a detailed outline of topics to be covered in science department meetings throughout the school year. Brodell's outline focused on professional learning related to science instruction and assessment. He suggests administrative matters should be communicated in written form and should only be discussed during department meetings if the matters are of particular importance.

Koch (1930a, 1930b) conducted the first empirical study of the chair with his survey of superintendents, principals, and chairs in 171 high schools across the United States. Koch's (1930a) first article reports information about organizational aspects of school departments and selection and qualifications of chairs, while the second article (Koch, 1930b) describes duties of chairs. Koch (1930a) found that the qualifications, selection procedures, and compensation for chairs varied widely, and he suggested "the position will produce favorable results directly proportional to the degree of freedom from routine obligations which the administrative authorities permit it to enjoy" (Koch, 1930a, p. 263)

According to Koch's (1930b) survey, the most prevalent duties for chairs involved implementing curriculum changes, participating in textbook selection, maintaining equipment and supply inventories, participating in the dismissal of teachers, and budgeting. Some chairs were also involved in selecting and

promoting teachers, but in the large majority of cases final authority with these functions rested with the school principal. Koch (1930b) argues that, ostensibly, a key role of a chair is to "close the gap between the classroom and the principal's office" (p. 340) through supervision of classroom instruction. Respondents to Koch's survey, however, reported that this function was severely limited by the time available to visit the classrooms of other teachers. Some chairs supplemented their classroom visits with other supervisory methods, such as department meetings, individual teacher meetings, or disseminating relevant literature. Koch (1930b) drew the general conclusion "that the department headship is in confusion" (pp. 348-349), with little agreement on the function of the position or the criteria for selection of chairs. As will be shown below, this conclusion was echoed in the literature more than 80 years later.

Chairs at San Diego Senior High School in the 1930s were expected to conduct exemplary and experimental teaching, with a particular focus on teaching "the slow learner" (Aseltine, 1931, p. 273). In addition to teaching, chairs' duties included administrative activities, directing extracurricular activities, designing curriculum, supervising instruction, counseling students, and articulating and integrating school units and programs (Aseltine, 1931).

In 1939, Reavis wrote that as schools were increasing in size and complexity, the principal must rely on the specialized knowledge and skills of chairs. Reavis went beyond simply describing chairs' duties and responsibilities to argue that the primary function of the chair should be the improvement of instruction. To accomplish this, the chair must supervise instruction, monitor and study the work of the department, improve teachers, use student achievement data to improve instruction, coordinate teaching practice, coordinate class scheduling and student grouping, and support teachers in helping struggling students. According to Reavis, chairs needed release time from their teaching duties to accomplish these duties. In addition to these instructionally focused duties, the chair could perform some administrative duties related to the department, but Reavis (1939) concluded, "it is unwise for the principal to make of the department head either a clerk or a part-time assistant principal" (p. 24).

Axley (1947) invoked the colorful analogy of a chair as "a race horse with plow-horse duties" (p. 1) to argue that many schools failed "to make full use of the specialized training of heads of department"

(p. 1). Axley's (1947) survey of chairs in more than 50 schools indicated that chairs were too busy with teaching and "petty details" (p. 1) to focus on their main function of instructional supervision. Beyond this time limitation, many chairs reported they were not consulted on personnel issues affecting their team of teachers (Axley, 1947).

In 1950, two authors provided separate accounts of the chairs' roles and responsibilities. Novak (1950) classified the role into administrative, supervisory, or instructional functions, and he listed 17 specific duties under the heading of instruction and supervision and 16 duties under the administrative heading. Novak (1950) suggested chairs needed specific training to fulfill all these duties and that "there are few, if any, who feel equal to all of the requirements" (p. 91). Rinker (1950) suggested chairs should maintain simultaneous foci on supporting departmental students and teachers and on links to the academic, professional, and school communities. The chair should protect and assist teachers in all matters. Beyond these, a chair must perform several clerical duties. The chair should also facilitate cooperation with universities, other schools, and the general community. Anticipating a theme of later research, Rinker also argued the chair should be an advocate of change, not a protector of the status quo.

Other authors in the 1950s provided specific guidance for chairs on leadership practices and instructional improvement. Mersand (1959) provided guidance for chairs seeking to support instructional improvement within their departments. In his discussion of the English chair's role in individualizing instruction, Mersand argued that a chair's role in the school depends largely on the chair's educational philosophy and focus. This focus should remain, according to Mersand, on improving instruction. Beyond philosophy and focus, Mersand (1959) argued, a chair can support instructional improvement through scheduling decisions, appropriate assignment of teachers, curriculum decisions, provision of appropriate instructional materials, communication and modeling of appropriate instructional strategies, assessment decisions, facilitating the sharing of instructional materials, and maintaining a positive and supportive attitude with other teachers. Shouse (1950) recommended that chairs help their teachers without evaluating them or attempting to wield undue influence on their teaching practices. Similarly, Novak (1950) advised that supervision involves the betterment of instruction by "bring[ing] out the best

in…teachers by recognition and assistance rather than direction" (Novak, 1950, p. 92). Satlow (1959) took the non-directive leadership approach further by proposing that chairs should practice democratic supervision in which they simply facilitate and communicate decisions made by department teachers. This view was counter to most of the early literature, which envisioned the chair as an extension of the hierarchical authority of the school principal.

The early writings on the high school chair described above are atheoretical and largely not empirical, but they provide a familiar picture of the chair position. While some educational terminology has changed over the past 100 years, it seems that the chair position has changed very little over that period of time. Many of these early articles foreshadow the role theory that would come to dominate later research on chairs beginning in the 1970s. These publications also provide a preview of three key themes that must inform any research on the chair position.

First, chairs were expected to play an important role in the ongoing improvement of teaching within their departments. In the early decades of the twentieth century, scholars largely discussed this role within the context of supervision of teaching, and these discussions implied a directive leadership style that held the chair as an expert above the regular classroom teacher. These discussions made clear the hierarchical relationships running from the principal at the top down to the chair, then to the classroom teacher, and finally to the student.

The second theme to emerge in the infancy of the chair role is the multiplicity of the role and the resulting ambiguity. From the beginning, scholars recognized that institutional constraints were not allowing chairs to carry out what most authors agreed should be their primary role, i.e. the improvement of instruction. Rather chairs' time was split among teaching their own classes, completing administrative and clerical duties, and supporting instructional improvement. This last set of duties was often sacrificed for the first two.

Finally, early authors pointed to a number of limitations that continue to affect chairs as they seek to enact leadership within the school context. The role ambiguity mentioned above combined with a lack of release time from teaching duties, lack of appropriate compensation, lack of line authority, and the

need for specialized leadership skills all severely limit chairs' ability to fulfill their promise as instructional leaders. These themes carried across the remaining decades of the twentieth century and into the recent literature on chairs.

Empirical studies (1960-2010). Following Axley's 1947 survey of chair responsibilities, more than a decade passed before empirical research on the chair role resumed with King and Moon's (1960) survey. Drawing on the summaries provided in Table 2.1 and Table 2.3, I provide a brief overview of the empirical research conducted from 1960 until 2010. I then review these studies in detail according to the research topics listed in Table 2.2.

King and Moon's investigation was the first of 11 studies conducted during the 1960s and 1970s; these studies largely consisted of descriptive surveys of chairs' roles and responsibilities. A notable exception to the survey methodology was Clear's (1969) attempt to compare experimentally the links between principals' and chairs' authority and teachers' decision making. Clear's inconclusive results and the lack of any other experimental studies in the field speak to the complex and context-dependent nature of school leadership. His results notwithstanding, Clear was the first researcher to articulate a clear theoretical framework, organizational behavior, for his research. In 1971, Verchota became the first researcher to invoke role theory in his study of chairs; this theoretical perspective continues to be important in chair research.

In the 1980s, researchers diversified the topics and the methods of their research on the chair role. Qualitative researchers employed a combination of interviews, school observations, and document analyses to provide in-depth descriptions of chairs at work in schools. The school reform movement that began in the 1980s influenced research topics, leading to an increased focus on instructional leadership and school change. Adding to this diversity, Busher's (1988) study of role overload in department heads in the United Kingdom was the first international study I was able to locate in the field.

The 1990s saw a shift toward qualitative and mixed-methods studies and an expansion of international scholarship with studies conducted in Canada, the United Kingdom, and Australia. Interview studies and case study designs dominated the qualitative research during this period.

Researchers began to shift their focus from simply describing the duties of chairs to studying the practices and contexts that contributed to or limited chairs' effectiveness. This shift in focus began to apply the distributed perspective of leadership that has come to dominate recent discussions of school leadership. Researchers also began to study the academic department as a unit of school administration and the academic subject as an important context for instructional leadership. Abolghasemi, McCormick, and Conners (1999) conducted the first quantitative study to move beyond simple descriptions to generate correlational statistics.

In the 2000s, the balance of research methods shifted further towards in-depth, qualitative methods, and there was a curious lack of mixed-methods studies. International researchers have continued to increase their influence on the literature during the 2000s. Nearly half (16 of 34) of the studies published during the 2000s were conducted outside the United States, and nine countries (Australia, Canada, Hong Kong, Malaysia, the Netherlands, New Zealand, Portugal, the United Kingdom, and Singapore) and were represented in these publications. Researchers also employed more diverse methods during this period. Qualitative researchers employed narrative methods (O'Neill, 2000), autoethnography (Willis, 2010), and action research (Skinner, 2007), in addition to case studies and interview research. Quantitative researchers applied more advanced statistical methods, such as structural equation modeling (Au et al., 2003), network analysis (de Lima, 2008), and analysis of a national longitudinal database (Printy, 2008).

Roles and responsibilities. Picking up where Axley left off in 1947, King and Moon (1960) surveyed 183 school districts in Minnesota and across the United States. Greater than 70% of districts surveyed employed chairs with the majority receiving extra pay, lighter teaching load, or both. Chairs reported the typical list of administrative and instructional duties. King and Moon (1960) concluded that while the status of the role had been in flux over the previous 30 years, chairs could play an important role in the "leadership job to be done in the improvement of instruction in the modern comprehensive high school" (p. 24). Additional surveys (Altimari, 1968; Berrier, 1974; Easterday, 1965; Fish, 1976; Manlove & Buser, 1966; Papalia, 1970; and Thorum, 1969) of principals and chairs across the United

States during the 1960s and 1970s revealed that chairs were engaging in a combination of administrative, supervisory, curricular, and instructional duties similar to those described in earlier publications.

According to these surveys, the fact that many school districts did not have official job descriptions for chairs, the lack of release time, and the lack of authority were the factors that most limited the effectiveness of chairs. These authors recommended formalizing job descriptions and selection criteria for chairs and providing adequate time and compensation as means to improve chairs' effectiveness. They also suggested that districts should clarify the chair's job description and provide additional time, clerical support, and professional learning, Altimari (1968) also argued that the chair's job description "should be designed to facilitate and improve instruction" (p. 311). Weaver and Gordon (1979) performed a task analysis of the chair role and suggested that chairs need professional development in human relations, educational planning, staffing, and clinical supervision to achieve success in the role.

While Verchota (1971) did not describe the methods of his study, he was the first author to invoke the theoretical perspective of role theory in his analysis of the chair position. Pointing to the fact chairs are expected simultaneously to take the narrow view of a specialist and the schoolwide view of a manager, Verchota concluded chairs experience role conflict because of their dual roles as teacher-specialists and as administrator-managers. In spite of this, Verchota found chairs exerted greater influence over teachers than did individuals at any other hierarchical level of the school organization.

Beginning in the 1980s, role theory became the dominant theoretical framework for research on the high school chair, and survey methods continued to dominate this area of research. Table 2.4 summarizes the research conducted on the general roles and responsibilities of chairs from 1980 until 2010. Twenty of these studies relied on survey methods, one investigation employed mixed methods, and eight studies were purely qualitative. The studies cited in Table 2.4 represent a span of nearly 30 years and schools across the United States and in four other nations. Methods in these studies vary from surveys of hundreds of educators to self-studies of single chairs. Across this diversity, the following five themes emerge with great clarity and consistency. Further, these themes echo the earliest writings on the

high school chair and paint a well-documented picture of the chair position. First, chairs are expected to carry out a wide range of administrative, managerial, supervisory, curriculum, instructional, and developmental responsibilities. Second, chairs experience role conflict as a result of their positioning between teacher and administrator. Third, chairs experience role ambiguity as a result of unclear expectations and lack of time and other resources. Fourth, chairs, administrators, and teachers agree that chairs should increase their focus on instructional improvement. Fifth, school districts can improve chairs' effectiveness by providing release time and remuneration, delegating more formal authority, and providing ongoing reflective professional learning targeted for chairs.

Table 2.4

Summary of Research on the Roles and Responsibilities of Department Chairs, 1980-2010

Reference	Methods	Key Findings
Mansfield, 1983; Kottkamp & Mansfield, 1985	Survey of 225 New Jersey (U.S.) chairs	• Role conflict and role ambiguity are related to powerlessness. • Role ambiguity, and to a lesser extent role conflict, are also related to perceived burnout. • Chairs reported low rates of burnout.
Pellicer & Stevenson, 1983	Survey of district instructional leaders in South Carolina (U.S.)	• Majority of districts did not have a job description or provide additional compensation or release time. • The roles most often identified as important for the chair were selecting instructional materials, designing and revising curriculum, assisting teachers in improving instruction, providing inservice training, and coordinating the instructional efforts of the department.
Girard, 1984	Survey of 51 parochial and public school chairs in Rhode Island (U.S.)	• Chairs were responsible for managerial, supervisory, curriculum, teaching, and administrative activities. • These activities led to role conflict and uncertainty. • The most prominent conflicts were inadequate time and remuneration, too many clerical duties, lack of teacher preparation and resources, staff morale problems, and lack of support.
Shimeall, 1987	Survey of principals and chairs in 300 U.S. schools	• Chairs receive little release time and no secretarial help. • Administrative and clerical functions were perceived as most important. • Teacher evaluation was less important. • There was agreement between functions and selection criteria.

Busher, 1988	Case study of single chair in the United Kingdom (UK)	The chair reported a reduction in role overload and positive affective results for teachers as a result of delegating departmental duties to teachers while providing appropriate support in these delegated duties.
DeRoche, Kujawa, & Hunsaker, 1988	Survey of principals and chairs in California (U.S.)	• Most schools did not have formal selection or evaluation procedures. • Most chairs did not have release time. • The five most important perceived areas of responsibility were budgets, goals and objectives, curriculum, textbooks, and scheduling. • Chairs were perceived as leaders in schools and in their departments.
Hulsey, 1988	Survey of 111 chairs in U.S. schools recognized as excellent	• Chairs would prefer more involvement in school decision-making. • Three factors contributed to higher role perceptions of chairs: departments of 10 or more teachers, formal selection by boards of education, and remuneration of at least $1000 per year.
Orris, 1988	Survey of 22 principals, 88 chairs, and 264 teachers in a large suburban school system in the U.S.	• All groups agreed as to how chairs spend their time, but disagreed on the amount of time spent. • Principals and chairs perceived chairs spent more time on tasks than did teachers. • Chairs spent greatest time on management and communication tasks. • Groups agreed that the chair role should be expanded to increase responsibilities in management, communications, personnel, and curriculum. • Principals and chairs favored expansion of the staff development role. • Principals reported greater support for expansion of the supervision role than did chairs or teachers.
Adduci, Woods-Houston, & Webb, 1990	Interviews and analysis of job descriptions with 56 chairs in the U.S.	• Identified six determinants of the chair role: job description, dual functions of curriculum/instruction and administration, chairs' goals, agreement by role senders, professional learning opportunities, and resources. • Job description, goals, agreement among role senders, and professional learning are sources of role ambiguity. • Functions and resources are sources of role strain.
Fletcher, 1991	Survey of principals, chairs, and teachers in 9 Washington, D.C. schools	• Chairs spent the majority of their time on managerial tasks. • All groups agreed that chairs should focus more on “encouraging, stimulating, and motivating teachers” (Abstract).
Kaminski, 1991	Survey of 47 chairs and 324 teachers from 16 South Carolina (U.S.) schools	• Chairs reported that the most important competency was serving as a link between teachers and the administration. • Chairs and teachers agreed that the least important competencies related to supervision and evaluation of instruction.

Worner & Brown, 1993	Survey of 193 principals and 421 chairs in Virginia (U.S.)	• Principals and chairs disagreed on the extent to which principals shared decision-making with chairs. • Principals and chairs agreed on the following major responsibilities of chairs: conducting department meetings, setting department goals and objectives, selecting materials and supplies, maintaining an inventory of materials and supplies, serving as departmental spokesperson, representing the department as adviser to the principal, and administering the department budget. • Principals also identified the following three as important: ensuring departmental consistency, recommending the department budget, and informing the department members of new developments in the field. • Chairs were not involved in personnel evaluation or instructional supervision. • Principals and chairs agreed that chairs should also be responsible for implementing curriculum change. • Principals indicated that chairs should also take more responsibility for monitoring departmental goals and objectives, developing school policies, stimulating professional growth of department members, handling departmental public relations, and promoting instructional change.
Bliss, Fahrney, & Steffy, 1996	Survey of 61 chairs and 108 teachers in four restructuring and four non-restructuring schools in Kentucky (U.S.)	• Chairs generally reported the rank of responsibilities as administrative, communication, and instruction. • Chairs identified the roles of administrator, facilitator, instructional leader, and transitional. English and math chairs were inclined toward facilitation and instructional leadership, while science and social studies chairs reported more emphasis on administration. • Nearly one-third of chairs aspired to greater instructional leadership. • Teachers perceived chairs to provide a moderate level of instructional leadership and reported that they would prefer chairs to increase emphasis on instructional improvement and assessment techniques. • There was no clear connection between chair reported roles and teacher perceptions of IL. No connection between chair roles and collegiality.
R. Korach, 1996	Survey of 118 chairs and 114 teachers from 34 Oregon (U.S.) schools	• Chairs perceived themselves to spend more time on their role than did teachers. • Teachers placed more importance than did chairs on protecting instructional time and supporting teachers' professional learning.
W. Korach, 1996	Survey of 27 superintendents, 34 principals, and 118 chairs in Oregon (U.S.)	Administrators placed higher value on the supervisory role while chairs placed higher value on the management role.
Brown & Rutherford, 1998	Case studies of 12 chairs in Catholic schools in the UK	• Chairs enacted all five approaches (i.e. servant leader, organizational architect, moral educator, social architect, and leading professional) in the leadership typology. • Leadership is enacted within practical constraints and local contexts. • The majority of chairs' time was spent on teaching, modeling good practice, and managing their departments with little time left for improving teaching and learning.

Abolghasemi, McCormick, & Conners, 1999	Survey of 59 chairs and 214 teachers in Australia	• Chairs -principal congruence was a better predictor of teacher support of school vision than was principals' visionary behaviors or structural coupling. • Principals influence teachers directly, but the influence is stronger when mediated by chairs.
Glover & Miller, 1999b	Observations and interviews of 56 chairs in the UK	• Chairs in schools whose management structures were focused on teaching and learning were more likely to spend time on leadership activities. • Department meetings and student support accounted for almost half of chairs' non-teaching time. • Many chairs were interrupted during class time to address issues or support other teachers.
Wise & Bush, 1999	Survey of 46 principals and 222 chairs; Case studies of three schools (UK)	• Chairs assumed a larger role in school management as a result of national education reforms. • Chairs' decisions were influenced primarily by their department members, followed by the senior management. • Chairs had inadequate time to carry out all of their responsibilities.
Schmidt, 2000	Interviews with 23 Canadian chairs	• Transition from teacher to chair was characterized by negative emotions resulting from role ambiguity, feelings of powerlessness, shortfalls in goal attainment, and strained relationships with teachers and students. • Chairs coped with these emotions by viewing their leadership role as an extension of their teaching role rather than a result of a formal title.
James, 2001	Survey of chairs in 56 largest Nebraska (U.S.) schools	• Chairs who received release time and compensation experienced less role ambiguity, less role conflict, and less concern regarding resource adequacy. They also had more positive perceptions of the chair role. • There were two distinct role configurations, evaluating administrator and program improver, for chairs in various schools.
Weller, 2001	Survey of 200 chairs in the U.S.	• Lack of training, line authority, and voice in schoolwide decisions all limit chair effectiveness. • Essential knowledge and skills for chairs include human relations, communication, leadership, group dynamics, flexibility, diplomacy, teaching practices, and subject knowledge. • Most did not list instructional supervision or curriculum development because of lack of time and responsibility. • About 85% believed chairs should be more involved in curriculum and instructional improvement.
Collier, Dinham, Brennan, Deece, & Mulford, 2002	Interviews of 26 chairs at two public and two private schools in Australia	• Chairs' initial expectations for the role did not match the reality. • Administrative duties constituted a greater portion of chairs workload than duties related to curriculum and instruction. • Chairs recommended reducing their teaching load and administrative duties to free time to spend with teachers. • Chairs perceived working with teachers and contributing to school change as the most positive aspects of their role. • Chairs cited lack of time, workload, external pressures, being caught between administrators and teachers, and dealing with under-performing teachers as negative aspects of the position.

Marotta, 2002	Survey of principals, chairs, and teachers in 38 schools in New York (U.S.)	• Administrators and chairs perceived management, supervision, human relations, organization, and programming all to be very important, but chairs assigned greater importance than did teachers. • Principals perceived the chair role to be supervisory while teachers perceived it to be administrative.
Skinner, 2007	Action research and self-study of English chair in Georgia (U.S.)	• The chair role is constantly enacted and negotiated and is characterized by "complexity and contingency" (p. 184); • The role can be characterized by the concept of heteroglossia (i.e. tensions within language that lead to meaning). • Reflective practice and self-study rather than fixed professional development is the most appropriate approach to make sense of and improve one's practice in the chair role.
Surash, 2007	Survey of 373 principals in New York (U.S.)	Chairs need skills to address vision, climate, management, community, citizenship, and larger community context.
Onn, 2010	Survey of 100 chairs in 15 Malaysian schools	Chairs perceived themselves to have a high competency level in interpersonal relations and moderate competency levels in department administration, curriculum development, supervision and mentoring of teachers, and professional development.
Willis, 2010	Autoethnography of science chair in Georgia (U.S.)	• Chairs' identity was constructed through interactions with stakeholders and within the complex context of the school. • Chairs functioned within the school hierarchy to serve as conduits, nurturers, department clerks, and resource managers.

Instructional leadership. Because of my own interest in instructional leadership and because so many authors have argued that this should be the chair's primary role, I am separating my discussion of instructional leadership from the more general discussion of distributed leadership and leadership practices found in the following section. Weller (2001), among others, suggested that chairs occupy a prime position for supporting instructional improvement in schools. Unfortunately the leadership capacity of chairs is not well understood, and chairs have been underused as a resource for improving instruction and student learning. However, a number of researchers have explored the personal characteristics, leadership practices, and contextual factors that contribute to chairs' ability to provide instructional leadership.

Three survey-based studies in the 1980s concluded that while teachers rated principals' instructional leadership behaviors higher than they rated chairs' leadership (Ibrahim, 1985), chairs did play a role in instructional leadership (Anderson, 1987) and that chairs could improve their supervision and instructional leadership skills through professional learning (Constanza, Tracy, & Holmes, 1987). Table 2.5 summarizes the findings of seven studies in relation to characteristics and behaviors of chairs that are associated with effective instructional leadership. Personal characteristics such as subject matter expertise, professional credibility, and trustworthiness provide a foundation for leadership, but instructional leadership is enacted primarily through ongoing interactions with department members. The most commonly cited strategies for instructional leadership were promoting collaboration and a collegial environment among teachers and promoting a clear and common instructional vision for the department.

These findings arose from a combination of quantitative and qualitative studies. Bliss (1989) used surveys and interviews to study chairs' and principals' influence on the use of groupwork among social studies teachers in six California high schools. Similarly, King (1991) conducted classroom observations and interviews to investigate principals' and chairs' influence on the teaching of higher-order thinking skills in social studies classrooms. Aside from suggesting specific leadership strategies, these two studies (Bliss, 1989; King, 1991) established that chairs, particularly when supported by the principal, could influence teachers' instructional decision making. Supporting the assertion that chairs can provide instructional leadership, Bliss, Fahrney, and Steffy (1996) found that teachers did perceive their chairs to be providing instructional leadership and that teachers would have preferred their chairs to place more emphasis on instructional leadership.

Table 2.5

Characteristics and Behaviors of Department Chairs Acting as Effective Instructional Leaders

Characteristics and Behaviors	References
Promote collaboration in planning, instruction, and assessment	Aubrey-Hopkins & James, 2002; Bolam & Turner, 2003; Flores & Roberts, 2008; Kaur, Ferrucci, & Carter, 2004; King, 1991
Facilitate collegial environment and shared leadership among teachers	Bliss, 1989; Harris, Jamieson, & Russ, 1995; Wettersten, 1992
Promote clear, common instructional vision	Bolam & Turner, 2003; Harris et al., 1995; King, 1991
Maximize teacher talents and defer to teacher expertise	Aubrey-Hopkins & James, 2002; Harris et al., 1995
Subject matter expertise	Bliss, 1989; Wettersten, 1992
Professional credibility as a good teacher	Bolam & Turner, 2003; Wettersten, 1992
Serve as bridge between teachers and administration	Duke, 1990; Wettersten, 1992
Direct involvement in instructional program	Flores & Roberts, 2008; King, 1991
Promote continuous discussion and monitoring of instruction and student learning among teachers	Harris et al., 1995; King, 1991
Use formal and informal department processes to support instructional improvement	Aubrey-Hopkins & James, 2002
Provide direct, positive feedback to teachers	Aubrey-Hopkins & James, 2002
Establish mentoring relationships	Aubrey-Hopkins & James, 2002
Build a distinctive departmental culture	Bolam & Turner, 2003
Organize professional learning around departmental collaboration	Flores & Roberts, 2008
Teach multiple levels of classes	Flores & Roberts, 2008
Promote climate for change	Harris et al., 1995
Monitor departmental performance	Harris et al., 1995
Promote effective use of material and human resources	Harris et al., 1995
Dedicate time outside of school day to instructional issues	Kaur et al., 2004
Promote teachers' familiarity with local, state, and national standards	Kaur et al., 2004
Trustworthiness	Wettersten, 1992

Wettersten (1992) based her findings on case studies of four chairs in suburban Chicago who were identified as exemplary departmental leaders. Harris, Jamieson, and Russ (1995) interviewed six chairs in the United Kingdom to determine the characteristics of departments that provide added value to student learning. Aubrey-Hopkins and James (2002) interviewed 17 Welsh chairs about their experience in influencing and developing teachers' practice. Bolam and Turner (2003) interviewed Welsh chairs and teachers to determine the methods used by chairs to improve teaching and learning in their departments, and Flores and Roberts (2008) conducted school visits to identify practices that led to high algebra achievement California high schools. In addition to chairs' personal characteristics and behaviors, administrative support (Wettersten, 1992; Aubrey-Hopkins & James, 2002), responsibility given to chairs by the principal (Wettersten, 1992), and external accountability (Aubrey-Hopkins & James, 2002) all supported the chairs' effectiveness as instructional leaders.

Kruskamp and Zepeda (Kruskamp, 2003; Zepeda & Kruskamp, 2007) found that the role conflict and ambiguity that plagued the chair position in general also applied to the practice of instructional supervision. In a case study of three chairs in Georgia, Kruskamp and Zepeda found that these chairs practiced instructional supervision in an intuitive and differentiated manner because they received neither direction from the school principal nor professional learning. A shortage of time and administrative emphasis also limited the chairs' effectiveness in instructional supervision. Like other researchers, Kruskamp and Zepeda suggested that chairs need professional learning targeted at their instructional leadership role (Aubrey-Hopkins & James, 2002) and that additional research is needed to fully understand this role (Todd, 2006; Wettersten, 1992). In particular, Todd's (2006) survey of principals, assistant principals, and chairs in Florida revealed that principals' and assistant principals', but not chairs', instructional leadership behaviors correlated with student achievement. Todd (2006) suggested further research be conducted to determine whether there is an indirect link between chair instructional leadership and student achievement. In a multi-site case study of chairs' instructional leadership, Klar (2010) concluded that principals were instrumental in fostering chairs' instructional leadership capacities.

Distributed leadership and leadership practice. Several researchers have concluded that chairs enjoy their greatest influence in a school environment that promotes distributed leadership and collegiality. Wyeth (1999) found that formal structure for shared decision making, delegation of authority by the school principal, and evaluation of teachers by chairs were among the factors that supported chairs' influence. Similarly in interviews with chairs and principals from schools in the United Kingdom, Brown, Boyle, and Boyle (1998, 1999) concluded that chairs can be most effective in schools with collegial management structures characterized by collaboration among departments, alignment between departmental and school priorities, and involvement of chairs and other teachers in schoolwide decision making. Aside from supporting chair influence, Numeroff (2005) found in a multi-site case study in Florida that collegial departments reduced teacher uncertainty and stress, improved instructional effectiveness, and supported student achievement.

In his network analysis of subject departments in Portuguese schools, de Lima (2008) found the majority of departments in the study exhibited focused, formal or multiple leadership. The focused, formal network represented a traditional, hierarchical leadership model, while the multiple leadership network represented the distributed leadership paradigm. Unfortunately, de Lima (2008) found that "regardless of the perceived leadership configuration, most chairs were not effective in creating a culture where teachers collaborated frequently with one another on professional matters" (p. 180), and he concluded that to achieve true distribution of leadership, formal titles are not sufficient. Rather, leadership must be embedded in chairs' and teachers' everyday practice. Brown, Rutherford, and Boyle (2000) also found that the ideal of distributed leadership was not being enacted in many English schools. Instead, chairs were simply being asked to take on responsibilities that were previously held by school administrators. These authors identified five issues that limited the enactment of distributed leadership: time, curriculum changes, need for professional learning, lack of vision, and lack of communication. Aronow (2006) identified a similar list of challenges in a case study of an American school.

Ryan (1999) and Ritchie et al. (2005) highlighted the complex and context-dependent nature of chair leadership. Ryan's (1999) case study of three Canadian high schools found that chairs drew

authority from experience, expertise, and positive personal characteristics and that chairs' perceived influence was linked to the school context and to the leadership practices of the principal. Ritchie et al. (2005) concluded that two Australian science chairs enacted leadership though a combination of individual leadership actions and collective leadership that drew on individuals and small groups of teachers to the benefit of the department and its students. Although both chairs expressed transformative goals for their departments, they enacted leadership differently based on their contexts and personal metaphors for leadership. The chairs "did not stick to a script or blueprint for heading a department" (Ritchie et al., 2005, p. 157).

While a collegial environment and distributed leadership at the school level support chairs' influence, effective chairs promote this same environment within their own departments, as shown in Table 2.6 along with other leadership practices of effective chairs. Researchers identified these practices through a combination of quantitative and qualitative studies. Hindman (1990) analyzed responses to the Managerial Practices Survey from 108 members of departments classified based on effectiveness. As discussed earlier, Wettersten (1993; 1994) conducted a case study with four chairs. Hofman, Hofman, and Guldemond (2001) conducted a multi-level statistical analysis of data from students, teachers, parents, chairs, and school leaders in the Netherlands. Au, Wright, and Botton (2003) applied structural equation modeling to survey responses from 2,739 administrators, chairs, and teachers in Hong Kong. Printy (2008) analyzed data from the National Educational Longitudinal Study of 1998 to determine the influence of principals and chairs on the formation of communities of practice among high school teachers. Benedict (2009) conducted case studies in three high schools in the United States.

Table 2.6

Leadership Practices of Effective Department Chairs

Practices	References
Facilitating collegiality, cooperation, and shared decision making	Au, Wright, & Botton, 2003; Hofman, Hofman, & Guldemond, 2001; Printy, 2008
Promoting school-based professional learning	Hindman, 1990; Hofman, Hofman, & Guldemond, 2001
Problem solving and reflective visioning	Au, Wright, & Botton, 2003; Hindman, 1990
Monitoring teacher practice and student achievement	Benedict, 2009; Hofman et al., 2001
Building a shared system of values	Benedict, 2009; Hofman et al., 2001
Representing the department and serving as a liaison between teachers and administration	Hindman, 1990; Wettersten, 1993
Facilitative enabling	Au et al., 2003
Modeling desired teacher behaviors	Benedict, 2009
Setting high expectations	Hofman et al., 2001

Besides enumerating some of the leadership practices of effective chairs, Wettersten (1993; 1994) addressed how chairs carry out their leadership. In contrast to the popular transformational view of school leadership, Wettersten concluded that the chairs in her case study relied on social exchange transactions to facilitate normal functioning of their departments and to support departmental innovations. Wettersten (1993) found that these exchanges were based on "conscious efforts to consistently deliver services and rewards" (p. 2) to department members and administrators. Reinforcing other studies, Wettersten's (1992; 1993; 1994) case study highlighted the fact that chair leadership in any school is intertwined with the principal's leadership. Thus, the relationship between a chair and school principal is critical. Symonds (1982) found in a single-school case study that this relationship is dynamic and influenced by the personal histories of the principal and chair and by the history and context of the school.

Consistent with other research on the chair's role, Clarke (1980) and Glover and Miller (1999a) found conflicting expectations and confusion relating to chairs' leadership practice. In a survey of

educators (36 principals, 36 chairs, and 108 teachers) in New York state, Clarke (1980) found that teachers, principals, and chairs held different expectations for the chairs' supervisory behaviors, and that chairs generally followed their own expectations or modified them to better align to the principal's expectations. Clarke also found that chairs' social behavior was individualized and contingent on personal characteristics and local context.

Glover and Miller (1999a) conducted a mixed-methods study of 24 schools in the United Kingdom and found confusion regarding chairs' role in schools. Newer chairs expected to exert influence on departmental practice and school policies, while more experienced chairs focused on management tasks. These authors also concluded that chairs balanced different leadership approaches (e.g., transactional vs. transformational and collegial vs. managerial) and that school management structure influenced the chairs' role. The most effective school management structures provided appropriate professional learning and held chairs responsible for "all aspects of curriculum planning and development" (Glover & Miller, 1999a, pp. 334-335) in addition to participating in school planning and policy making. Chairs in such schools tended to act as initiators, rather than inhibitors, of change. Three quarters of chairs in Glover and Miller's (1999a) study were perceived to be leading in a satisfactory manner. Senior administrators identified three major criticisms of chairs: that they failed to see their role in terms of whole-school improvement, that they overemphasized administrative duties, and that they felt any classroom monitoring of other teachers compromised their professional relationships. Participants cited time as the major limitation on chairs' involvement in whole-school policy.

Two qualitative studies in the 2000s addressed chairs' experience and understanding of their leadership role. James and Aubrey-Hopkins (2003) identified seven factors—teacher characteristics, departmental cohesion and shared vision, leadership approach, subject-related issues, influence of school administration, school and community contexts, and lack of time—that affected chairs' experience of leadership authority in interviews with 17 Welsh chairs. These authors (James & Aubrey-Hopkins, 2003) found that chair authority was dynamic and constructed and that these factors were moderated by the chair's internal sense of authority. Chairs in this study used boundary management to protect their

departments' core processes and resources, and successful boundary management enhanced the chairs' leadership authority. Finally, James and Aubrey-Hopkins (2003) found chairs felt a significant tension between authority within their departments and their own accountability to senior school managers.

Feeney (2009) found the five chairs in his case studies did not enact leadership to foster collaboration that might lead to schoolwide improvements in student learning. Rather, chairs described their role in managerial terms and viewed leadership as a series of activities they did for, not with, teacher and administrators. Feeney (2009) found these chairs were not enacting distributed leadership and that there was "a high level of participation accompanied by a low level of skill" (p. 215) in leadership. Feeney attributed this lack of effective leadership to the fact that chairs felt too busy and held a narrow conception of leadership that was based on position rather than personal interactions.

School change. A number of researchers have investigated the role chairs play in the process of school change with mixed findings. Based on qualitative field studies of high schools in the midst of change processes, Hall and Guzman (1984) found that the impetus for change generally came from a source outside the school and that chairs generally did not serve as facilitators of change. The actual roles of chairs were unclear and were determined by the school principal. In a series of qualitative investigations, Hord and Murphy (Hord, 1984; Hord and Murphy, 1985) found that the chair is a viable role for facilitating change but that chairs are limited by school policy, compensation, and lack of time.

In Brown's (1993) ethnographic study of change in Canadian high schools, principals and chairs provided the most visible leadership for change by employing practices associated with transformational leadership. In case studies of four Canadian schools implementing a new social studies curriculum, Henderson (1993) found that chairs who were effective in supporting school change were goal-oriented, had close ties to and influence on school administration, used a combination of interpersonal skills and technical expertise to assist teachers, and organized their departments into teams to facilitate collaboration. These chairs were limited by role ambiguity, lack of time and money, restrictive school schedules, and lack of instructional leadership training. Also working in Canadian high schools and based primarily on interview data, Hannay and colleagues (Hannay & Denby, 1994; Hannay & Ross,

1999; Hannay, Smeltzer Erb, & Ross, 2001) concluded that while chairs can support school change, that change is best facilitated when the school structure can be reorganized to provide a more horizontal leadership structure.

Mayers and Zepeda (Mayers, 2001; Mayers & Zepeda, 2002) reported a case study of the role of five chairs in one high school's move to a block schedule. Chairs faced three major challenges in facilitating the transition to the block schedule. First, chairs had to manage the multiple learning curves of reformatting the scheduling of their departmental work, restructuring their own teaching, and supporting teachers' transition to teaching on the new schedule. These learning processes were hindered by insufficient professional learning. Second, chairs experienced role conflict and ambiguity in the tensions between their teacher and chair roles and between their roles as instructional leaders and as clerical managers. Finally, this role conflict was worsened by the decrease in release time associated with the move to block scheduling. Mayers and Zepeda recommended school districts improve consistency between job descriptions and administrative expectations for chairs, provide professional learning designed specifically for chairs, and provide needed resources and ongoing support for chairs.

Two other case studies provided insight into how chairs facilitate the implementation of subject-specific curricula. Rigano and Ritchie (2003) described how an Australian science chair facilitated change by creating discomfort with the status quo among teachers while providing the support the teachers needed to change. The chair also modeled changing practices and acknowledged difficulties and compromises that were part of the change process. The chair faced three main barriers to implementing curriculum change: conservative background of department teachers, school structures aimed at preserving public image, and a lack of an inquiry community among department teachers. Tam (2010) studied a Chinese language chair in a Honk Kong Christian school. Tam found the chair used personal charisma, shared vision building, teacher empowerment, changing beliefs and enhancing the capacity of teachers, and fostering collegiality among teachers to overcome teachers' low receptivity to new school-based curriculum development, teachers' limited time and expertise in the new curriculum model, and a need for more effective collaboration in the department. As Rinker suggested in 1950, chairs can

facilitate change, but doing so requires a favorable organizational environment, specific leadership skills, and sufficient time to support teachers in the change process.

Subject context. Teachers at the secondary level identify with the academic department as the unit "which organizes teachers spatially, temporally, administratively, and symbolically" (Siskin, 1994). Subject departments come with their own specific geographies, histories, and subcultures, and the chair can be important in establishing, maintaining, or challenging those subcultures (Siskin, 1997). In her mixed methods study, Siskin (1991) found that departments divide faculty, create distinctive cultures, and control key decisions about resources, professional tasks, and careers. Subject departments can also present barriers to reform aimed at a shared school vision (Siskin, 1997), and the variation and ambiguity in chairs' responsibilities can prove stressful for chairs and for school administrators (Siskin, 1997). Thus, departments represent a crucial unit of study for research on secondary education.

While Leslie (1980) found that school climate perceptions were stable across departments in a survey of teachers in eight Texas high schools, other authors have found that department affiliation and academic subject represent important factors in the study of chair leadership. In interviews with teachers from Massachusetts, Johnson (1990) found that chair leadership styles ranged from authoritarian to collegial based on their personal characteristics and were influenced by the organizational context of the school. Johnson also found that the ambiguity of the chairs' dual roles as teachers and administrators provided "productive tension" (p. 177) for some chairs and a major challenge for others. Because of the central role chairs play in departments, Johnson concluded that researchers should continue to study how chairs carry out their leadership role.

Using a combination of surveys and interviews, Turner (2003) found that the mix and priority of themes affecting teaching and learning in academic departments in the United Kingdom was unique to the subject area. For example, science chairs reported that their decisions were influenced by the perception of science as a practically based subject, the prescriptive nature of the science curriculum, the everyday relevance of subject, the status of science as a core subject within the National Curriculum, the reliance on cumulative knowledge in science, and the appeal of science to both boys and girls. Bolam and Turner

(2003) found that the structure of a subject (e.g., science being taught as distinct biology, chemistry, and physics courses) but not the cognitive content of the subject affects chairs' instructional leadership practice. Turner (2003) suggested there are distinct management implications for each subject based on the nature of the subject and the specific curriculum and accountability context of the subject. Bliss et al. (1996) also found in a sample of 61 chairs in Kentucky that English and mathematics chairs were more inclined toward the roles of facilitation and instructional leadership, while science and social studies chairs placed more emphasis on their administrative role. Thus while chairs in different subjects are delegated similar responsibilities, they carry out these responsibilities in different ways within different working contexts.

Conclusions and Implications

While individual studies reviewed here exhibit strengths and weaknesses in methodology or argumentation, researchers overall have relied too heavily on survey methods and have focused too often on basic questions about chairs' roles and responsibilities. Even so, the number of studies reviewed and the overall consistency of findings overshadow these limitations and paint a reliable and realistic portrait of the high school chair as a professional who is asked to do too much in too little time and with too few resources. However beyond the limitations, overload, ambiguity, and role conflict that have defined the position since its inception, several important themes emerge from the literature and point to the potential for the chair to act as an instructional leader in the high school and to implications for future research.

First, existing literature highlights the key leadership roles chairs can play within high schools. There is considerable evidence that chairs can act as instructional leaders, and this is widely accepted as their primary goal. However, chairs have not fulfilled this potential, and additional research is needed to illuminate the conditions and practices that allow chairs to act as effective instructional leaders. There is also evidence that, under the proper circumstances, chairs can facilitate school change leading to improvements in teaching and student learning. Second, this review provides some understanding of the contexts in which chair leadership occurs. Chair leadership is enacted primarily through social interactions with teachers and administrators and is mediated by school leadership structures, local

context, and subject-area differences. Chairs are most effective within a distributed leadership framework and when they build a collegial and collaborative environment within their departments.

Finally, current research points to some important directions for future research. Several studies (Skinner, 2007; Willis, 2010; Zepeda & Kruskamp, 2007; de Lima, 2008; Ritchie et al., 2005) indicate the need to move beyond the strict application of role theory to explore chair leadership in terms of the social interactions through which it is enacted. Also related to research methodology, O'Neill (2000) suggested over 10 years ago that narrative methods offered an ideal tool to understand and enhance chairs' work; unfortunately, few researchers have taken up this suggestion. Some researchers (Au et al., 2003; Bolam & Turner, 2003; Wettersten, 1993,1994) have proposed conceptual models describing the work of the high school chair, but this area of research is underdeveloped. Such conceptual models may be important in unifying research on chairs and in informing their professional practice.

Across 100 years of scholarship on the high school chair, there is consensus that instructional leadership should be the chair's primary role. At the same time, there is consensus that schools are not utilizing chairs to their full potential within this role for a variety of reasons. Further while chairs face many similar challenges, the literature indicates that each academic subject presents unique challenges and issues as chairs enact instructional leadership. Therefore, it is appropriate to undertake an in-depth study of instructional leadership practice within a single subject area. Considering all the research reviewed in this paper, an empirical answer to the question of how science chairs effectively act as instructional leaders for the teachers in their departments represents an important gap in the literature on high school chairs. Thus this dissertation, by employing a narrative approach to develop a grounded conceptual model of science instructional leadership fills an important gap in the literature and provides a meaningful guide for practicing science chairs.

Instructional Leadership

The historical context for current discussions of instructional leadership traces from the reform efforts begun in the late 1970s and early 1980s and symbolized by the report, *A Nation at Risk*, published by the National Commission on Excellence in Education (1983; Hallinger, 2005; Herbst, 1996). This

report, though hyperbolic, signaled a shift back toward a high school curriculum in line with the academic, liberal arts focus of the Committee of Ten report from the turn of the twentieth century; this was in contrast to the focus on workplace preparation seen in the 1970s (Herbst, 1996). Educational scholars argued for a focus on teaching and learning at the same time that control of educational policy shifted more and more from school leaders to state and national politicians (Herbst, 1996).

Amid this climate of perceived "failure and mediocrity" (p. 252, Pulliam & Van Patten, 1999), researchers, beginning with Edmonds (1979), began a search for "effective schools" with the goal of identifying characteristics that could be employed to improve other schools. Two major characteristics emerged: community support and "dynamic" (p. 252, Pulliam & Van Patten, 1999) instructional leadership enacted by the school principal. At this same time, principals' own writings and speeches about the principalship emphasized instructional leadership as its most important role (Fenske, 1997). These writings identified professional development and supervision as the most effective strategies in enacting instructional leadership (Fenske, 1997). The instructional leadership literature of the 1980s focused almost exclusively on the principal; teachers, chairs, and assistant principals were largely absent from these discussions (Hallinger, 2005). Among the many models of instructional leadership proposed by this literature, Hallinger and his colleagues identified three common dimensions of instructional leadership: defining the school's mission, managing the instructional program, and promoting a positive school learning climate (Hallinger, 2005). Synthesizing twenty-five years of research, Hallinger (2005) suggested that an instructional leader should focus on:

- creating a shared sense of purpose in the school, including clear goals focused on student learning;
- fostering the continuous improvement of the school through cyclical school development planning that involves a wide range of stakeholders;
- developing a climate of high expectations and a school culture aimed at innovation and improvement of teaching and learning;

- coordinating the curriculum and monitoring student learning outcomes;
- shaping the reward structure of the school to reflect the school's mission;
- organizing and monitoring a wide range of activities aimed at the continuous development of staff; and
- being a visible presence in the school, modeling the desired values of the school's culture (p. 233).

Recently, scholars have reinterpreted this traditional notion of instructional leadership. Robinson (2010) proposed a conceptual model of instructional leadership based on empirical research linking such leadership to positive student outcomes. This analysis produced three interrelated leadership capabilities: the ability to integrate educational knowledge into leadership practice, the ability to build relational trust with stakeholders, and the ability to solve complex problems within the local school context (Robinson, 2010). Glickman, Gordon, and Ross-Gordon (2010) proposed a collegial model of leadership that focuses on teacher involvement and growth, collaboration, ongoing reflection, and peer coaching aimed at improving instruction. Another recent account of instructional leadership provides a broader view of school leadership. Horng and Loeb (2010) argued that effective organizational management is more important than traditional notions of classroom observations and direct coaching. This approach emphasizes hiring, assigning, supporting, and retaining high-quality teachers; allocating resources; and maintaining a positive work and learning environment.

While the language of instructional leadership persists from the days of effective schools research, the focus is now driven by the continuing movement toward common state standards and standardized testing (Hallinger, 2005). In this high-stakes context, it is widely recognized that it is impossible for a principal, particularly in a high school, to carry out all the tasks of instructional leadership alone (Hallinger, 2005). Marzano (2003) drew on this collective view of leadership in his interpretation of the research on leadership for change in schools. He concluded that leadership for change is best carried out by a small leadership team composed of the principal and teachers and focused

on providing strong but respectful guidance through interpersonal relationships (Marzano, 2003). Also building on notions of more inclusive leadership approaches, Spillane and colleagues (Spillane, Halverson, & Diamond, 2001; Spillane, 2006) developed the framework of distributed leadership, which casts school leadership not in terms of the individual efforts of the school principal but in terms of distributed cognitive and activity networks that included school administrators and teachers.

Recent work by Wayne Hoy and colleagues can also inform our understanding of instructional leadership. Hoy, Tarter, and Hoy (2006) identified the construct of academic optimism as a school-level factor that explains student achievement in statistical analyses controlling for socioeconomic status, urbanicity, and previous achievement. Academic optimism comprises three interdependent aspects: academic emphasis, collective efficacy, and faculty trust in parents and students. According to Hoy et al. (2006), academic emphasis describes "the extent to which a school is driven by a quest for academic excellence" (p. 427); collective efficacy represents "the judgment of teachers that the faculty as a whole can organize and execute the actions required to have positive effects on students" (p. 428); and faculty trust reflects the belief that students, parents, and teachers share common learning goals and are all working in one another's best interests. A previous study by Alig-Mielcarek and Hoy (2005) demonstrated that instructional leadership only affects student achievement by working indirectly through academic emphasis. Thus, the concept of academic optimism is essential to the development of any model of effective instructional leadership.

Various authors have suggested ways that leaders can foster academic optimism in their schools. Hoy, Tarter, and Hoy (2006) suggested this could be done through modeling and persuasion, reducing teacher stress, and including faculty in decision making. McGuigan and Hoy (2006) found that school structures and processes—such as collaboration and joint planning time, professional learning aligned to the school's academic goals, teacher assignments that build confidence, and celebration of classroom successes—that "support and enable teachers' work" (p. 221) enhance academic optimism. Mascall, Leithwood, Straus, and Sacks (2008) also reported that planned approaches to distributed leadership in which departmental and school goals were well aligned supported academic optimism.

While chairs are rarely mentioned in the instructional leadership discourse, this literature should inform the understanding and enactment of chairs' leadership practice. Principals exert a strong but indirect influence on student achievement (Alig-Mielcarek & Hoy, 2005; Gurr, Drysdale, & Mulford, 2006, 2007), and chairs likely represent an important mechanism of coupling principal leadership to teacher practice and student learning. Weick's (1976) view of schools as "loosely coupled" organizations sheds light on the ambiguity of the chair leadership role. In a loosely coupled organization, components of the system are connected yet remain largely independent. Thus while there is an obvious connection between principals and teachers, the actual teaching that occurs behind the classroom door is largely independent of the principal's office. This view provides a stark contrast to the rational bureaucratic view of organizations and aligns with McLean's (2010) recommendations for multifaceted leadership in complex school environments. Chairs occupy a prime position from which to improve the coupling between the instructional vision laid out by the principal and the practice of science education in the classroom. Weller (2001) suggested that "department chairs are in an ideal position to facilitate instructional improvement because of their daily contact with teachers and their own instructional expertise" (p. 74).

Science Education Leadership

Recent literature in science education leadership lays out specific challenges and goals for science education and suggests approaches for science education leaders ranging from teacher leaders to principals to state-level administrators. Century (2010) identified five major challenges for science education in the 21st century: integrating science education in the larger context of STEM (science, technology, engineering, and mathematics) education; developing high-quality assessments that are appropriate to the goals of science education; implementing common standards; recruiting and retaining high-quality teachers; and accomplishing 21st-century goals for students (*i.e.* critical thinking, collaboration, and problem solving) while also anticipating future goals. Bybee (2006) suggested that science education leadership should focus on "the fundamental purpose of science education," which he defined as "achieving high levels of scientific literacy for all students" (p. 148). To achieve this goal,

science education leaders at all levels must focus on teacher-student interactions that enhance student learning. This view emphasizes curriculum materials, instructional strategies, classroom assessments, and professional learning over political views that see school choice and charter schools as the answer to increasing student literacy in science. Still, leaders must recognize that they are working within a complex system shaped by political, social, and economic pressures. Leaders must constantly negotiate a range of tensions, such as those between leading and managing and between consistency and flexibility. As we look to the future of science education, Bybee (2006) suggested that science education leaders should focus on "introducing international perspectives, centering on the educational core, maintaining an inquiry orientation, upholding the integrity of science, and integrating professional development into school science programs" (pp. 150-151). For Bybee (2006), the educational core takes into account issues of curriculum, instruction, and assessment and is built on a research-based understanding of student learning in science.

General approaches to leadership in science education. Rather than seeking structural changes in the overall education system, science education reforms stemming from the *Benchmarks for Science Literacy* (American Association for the Advancement of Science, 1993) and the *National Science Education Standards* (NRC, 1996) largely focused on the classroom level. Consequently, the "culture of isolation" (Saginor, 2006, p. 164) that persists among teachers has limited the effectiveness of these reforms. Likewise, the seemingly promising teacher-leader model has proven inadequate in achieving systemic reform (Saginor, 2006). Klentschy (2008) argued that teacher leaders could act as change agents within the school to achieve science education reforms. However, teachers and teacher leaders alone cannot be expected to sustain reforms; rather, teachers' efforts must be supported and facilitated by the school principal (Saginor, 2006; Rhoton & McLean, 2008). Saginor (2006) argued that effective reform occurs only when the school principal initiates or enthusiastically endorses a shift in school culture that promotes the development of professional learning communities and a focus on student learning.

Conversely, Landel and Miller (2010) point out that the job of instructional leadership is too big for the principal alone. Therefore the principal must facilitate teacher leadership in science through a

collaborative leadership approach (Landel & Miller, 2010). Ritchie (2006) supported this idea as he summarized his own research on science teacher leadership conducted from the distributed leadership perspective. Science department heads drew on and facilitate the sharing of collective internal resources and seek external resources for the improvement of practice within the department (Ritchie, 2006). Chairs exercised individual leadership, accepted influence from teachers in the department, and enabled other teacher leaders within the department (Ritchie, 2006). Finally, Ritchie (2006) suggested four approaches to foster distributed leadership in science education: establishing a culture of trust and respect, orienting individual actions toward the collective benefit, enacting cogenerative dialogues, and building solidarity through successful interactions among teachers and between teachers and students.

Several authors have suggested knowledge, skills, dispositions, or leadership approaches needed by principals or teacher leaders to provide effective instructional leadership in science. Landel & Miller (2010) suggested that teacher leadership is most effective when it is focused on supporting classroom instruction through clinical observation, model lessons, analyzing student work, or teacher discourse. In addition to the general aspects of instructional leadership, high school principals can support instruction in science by advocating for science to be taught in earlier grades, providing targeted professional learning, and understanding science education reforms to the extent needed to supervise science instruction with the goal of deep student learning in science (Saginor, 2006). Century (2010) suggested that science education leaders need passion, communication skills, the ability to facilitate trust, management skills, the ability to foster collaboration, intellectual openness, creativity, problem solving and critical thinking skills, the ability to provide incentives, the ability to demonstrate the fit of new initiatives in the local context, and a focus on continuous improvement and building capacity over specific programs and reforms.

McLean (2010) recommended "a leadership approach that promotes focusing on important outcomes in the midst of many competing agendas" (p. 51). McLean (2010) then described six components of leadership that largely echoed Hallinger's (2005) summary of instructional leadership literature. According to McLean (2010), leadership should aim to create a learning community based on

"the belief in common values and goals, the ability to learn from each other, and the idea of learning as an ongoing process" (p. 54). Further, decision-makers within this community "should ask how this will help achieve the organizational goals" (p. 59).

Lederman & Lederman (2010) reported on a master's program designed to develop science teacher leaders who guide other faculty within their own school toward improving instruction and student learning and who disseminate high-quality practice to the broader science education community (Lederman & Lederman, 2010). The program is designed to develop knowledge and skills in curriculum development, action research and data-driven decision making, assessment and evaluation, content knowledge, inquiry and nature of science, advanced instructional strategies, supervision and mentoring, connecting curriculum to community resources, leadership, grant writing, and contributing to the professional community.

Gess-Newsome and Austin (2010) reported findings from an interview study with a selection of teacher leaders who had participated in professional development programs conducted by the authors. The participants included chairs, district science supervisors, informal teacher leaders, and teacher educators. These participants reported a long list of common characteristics of teacher leaders including advocacy for science learning and science education reform, supporting fellow science teachers, a reputation for excellence and innovation, promoting public understanding of science, facilitating learning and improvement in other teachers, and perseverance (Gess-Newsome & Austin, 2010).

Short (2006) described curriculum leadership as a process of supporting improvement of science education in a school district through implementing reform-based curriculum. Short (2006) argued that curriculum leaders rely on an understanding of adult learning, change processes, building relationships, and facilitating professional development and that they need skills in "working collaboratively, communicating a vision and a plan, and using transactional and transformational leadership to facilitate the change process and adult learning" (p. 95). Rhoton and Wojnowski (2006) identified a number of approaches—creating a clear vision that is focused on instruction, providing access to high-quality instructional materials and a supportive learning environment for all students, supporting alternative

assessment and ongoing professional development, hiring and mentoring highly-qualified teachers, maintaining appropriate class size, communicating current research and allowing teachers to visit innovative science programs, and encouraging grant proposal writing—principals can take to support science education reform. I suggest chairs can support these approaches effectively.

Schmidt and Kher (2010) used data from the TIMSS to argue that "when content coverage is coherent, focused, and coupled with rigorous expectations, student learning is increased" (p. 69). Given the loosely coupled nature of the educational system, this coherent content coverage requires targeted instructional leadership at the state, district, and school levels. According to Schmidt and Kher (2010), superintendents and principals, in particular, should take up this leadership role and "buffer teachers from noninstructional issues so they are able to concentrate on issues of instruction and content coverage" (p. 72). These authors' focus on simple "content coverage" unfortunately ignores many complexities of the teaching and learning processes. However, the point remains that an important role of an instructional leader is to shield teachers from pressures and activities that distract them from the instructional process. In particular, Schmidt and Kher (2010) argued, an instructional leader should maintain focus on consistent instruction to ensure that all students receive equal access to science learning.

Department chair leadership of science curriculum and instruction. While the school principal is generally recognized as the primary instructional (e.g., Zepeda, 2007) and curriculum (e.g., Glatthorn, Boschee, & Whitehead, 2009) leader of the school, the literature (e.g., Bliss et al. 1996) indicates that chairs are expected to enact instructional and curriculum leadership and that teachers would prefer chairs to increase their focus on instructional issues. Chairs often minimize these issues at the expense of other administrative and managerial tasks. However, Sergiovanni (1984) argued that educational leadership, including curriculum and instructional leadership, "legitimizes and justifies the chairperson role" (p. 311). Other aspects (e.g., managerial, clerical, or administrative) of the role support and facilitate the educational leadership role. My goal in this discussion is to explicate the contexts, goals, and methods of curriculum and instructional leadership as high school science chairs might enact such leadership.

Various definitions of instructional leadership and curriculum leadership abound in the educational leadership literature, and these definitions often overlap. While the concepts of curriculum and instruction are certainly complex and intertwining, for the purpose of organizing this discussion I will take the simplistic perspective that curriculum entails *what* teachers teach and that instruction entails *how* teachers teach. These concepts are intertwined; "*what* gets taught (curriculum) has a strong impact on *how* it gets taught (instruction)" (Glickman et al., 2010, p. 360, italics in original). Further, teaching occurs within the social context of the classroom and has the ultimate goal of supporting student learning in science. Thus, instructional leadership is context-dependent (Hallinger, 2005) and is best "viewed as a function and process rather than a role or position" (Glickman et al., 2010, p. 10).

The literature on principal leadership provides broad directives aimed at schoolwide influence. For example, Alig-Mielcarek and Hoy (2005) proposed that instructional leadership comprised the three processes of defining and communicating goals, monitoring and providing feedback on teaching and learning activities, and promoting and emphasizing the importance of professional development. Further, literature on principal leadership has traditionally included a focus on supervising teachers as a method of instructional or curriculum leadership. While chairs are important in supporting broad initiatives, such as the school vision set by the principal (Abolghasemi et al., 1999), I aim to focus this discussion on the interactions that science chairs have with the teachers within their departments. Further, I will avoid discussion of curriculum and instructional leadership through teacher supervision. Chairs often lack the time, authority, or training to conduct effective supervision (Zepeda & Kruskamp, 2007), and teachers often do not perceive classroom observations to be related to instructional improvement (Anderson, 1987). In general, instructional leadership by chairs appears to be a less formal endeavor than such leadership by the principal; Zepeda and Kruskamp (2007) found that chairs carried out instructional supervision in intuitive and negotiated ways that centered on professional relationships with teachers.

The limited literature on department chair instructional leadership provides some general guidelines for leadership practices in which chairs engage. Chairs can facilitate collegiality, cooperation, and shared decision-making within their department (Au et al., 2003; Bliss, 1989; Harris, et al., 1995;

Hofman et al., 2001; Printy, 2008; Wettersten, 1992). Within this environment, chairs can promote a common instructional vision and shared values that align with the school's instructional vision (Benedict, 2009; Bolam & Turner, 2003; Harris et al., 1995; Hofman et al., 2001; King, 1991). Further, chairs can promote collaboration in planning, instruction, and assessment (Aubrey-Hopkins & James, 2002; Bolam & Turner, 2003; Flores & Roberts, 2008; Kaur et al., 2004; King, 1991). According to Helterbran (2008), collaborative planning helps teachers to "identify instructional goals, carefully reflect on what does and does not work in a given school environment and student population, and work together to address weaknesses in the curriculum and instruction offered" (p. 90). Finally, chairs can use departmental processes, such as department meetings, to support instructional improvement (Aubrey-Hopkins & James, 2002) by promoting continuous discussion and monitoring of instruction and student learning among teachers (Benedict, 2009; Harris et al., 1995; Hofman et al., 2001; King, 1991). These discussions and reflections can serve as school-based professional learning (Flores & Roberts, 2008; Hindman, 1990; Hofman et al., 2001) that is embedded within teachers' daily work. The result of these efforts should be a professional community focused on continuous improvement of student learning.

In addition to the research on chair practice cited above, Park and Oliver's (2008) work on pedagogical content knowledge (PCK) for science teaching provides a useful perspective on science instructional leadership. Park and Oliver (2008) defined PCK as "*teachers' understanding and enactment* of how to help a group of students understand specific subject matter using multiple instructional strategies, representations, and assessments while working within the contextual, cultural, and social limitations in the learning environment" (p. 264, emphasis in original). Park and Oliver's (2008) model incorporated six components of PCK: (a) orientations to science teaching, (b) knowledge of students' understanding in science, (c) knowledge of science curriculum, (d) knowledge of instructional strategies and representations for teaching science, (e) knowledge of assessments of science learning, and (f) teacher efficacy. Orientations to science teaching refer to teachers' beliefs about the purposes and goals of teaching science and would influence teachers' decisions related to both curriculum and instruction.

Given this definition, instructional leadership might be described as the act of facilitating the development and maintenance of PCK among teachers. This is not a simple act of transmission; as Park and Oliver (2008) argued, "teachers are knowledge producers not knowledge receivers" (p. 278). Rather than receiving PCK from school leaders or from professional learning experiences, teachers develop PCK through reflection-in-action and reflection-on-action. This reflection is facilitated in a professional community that supports collaboration (Helterbran, 2008; Thoonen, Sleegers, Oort, Peetsma, & Geijsel, 2011). Within such a community the chair, as a content expert and master teacher, can serve as a model and source for the knowledge, skills, and attitudes that comprise PCK for science teaching. Such a professional community provides a space for reflection on and improvement of all aspects of teaching and learning. Likewise, Park and Oliver's (2008) model of science PCK provides a holistic view of science teaching. However, it is useful to consider the core elements of curriculum and instruction separately to identify unique aspects of leadership in these areas and to point out instances where the two leadership areas enhance each other.

Science curriculum leadership. Glatthorn et al. (2009), in their textbook on curriculum leadership, identified seven distinct types—recommended, written, supported, taught, tested, learned, and hidden—of curriculum, which can range from national policies to classroom lesson plans. National, state, and local curriculum standards heavily influence the modern science curriculum. However, teachers ultimately create the classroom curriculum. Taking this complexity into account, Glatthorn et al. (2009) described curriculum as "the plans made for guiding learning…and the actualization of those plans in the classroom" (p. 3). Linking the definition of curriculum to classroom practice acknowledges that formal curriculum plans "are often ignored or modified" (Glatthorn et al., 2009) as teachers interact with their students on a daily basis. Sergiovanni (1984) supported this perspective when he stated, "In practice the curriculum exists more in the minds and hearts of teachers than in aims, objectives, textbooks, or curriculum guides" (p. 314).

Marzano, Water, and McNulty (2005) identified five decisions teachers must make as they adapt curriculum standards and resources to meet the needs of their students; teachers must decide (a) which

information and skills to focus on, (b) which activities will ensure that students experience content multiple times, (c) which skills need to be measured rather than simply introduced, (d) how to present topics in a way that highlights their similarities and builds on students' experiences, and (e) how to provide complex tasks that force students to apply their learning in new ways. While these decisions often must be made in the context of state standards and standardized testing, recognizing teachers' expertise and involving them in curriculum development can improve teacher motivation. This leads to improved instructional practice (Thoonen et al., 2011) and supports success of the curriculum (Glatthorn et al., 2009). Chairs can support the dual goals of teacher involvement in curriculum development and alignment with curriculum standards by establishing an instructional framework within which teachers work collaboratively to move from curriculum standards to classroom curriculum to instructional planning. Even when a legislated curriculum restrains the development process, it is important that teachers reach a common understanding of the skills and values inherent in the curriculum and of the pedagogy implied by the curriculum; it is also important for teachers and leaders to monitor curriculum implementation and student learning (Busher, Harris, & Wise, 2000).

Limited research is available that explicates specific roles that chairs play in curriculum leadership. Researchers have reported that chairs coordinate compliance with internal and external curriculum guidelines (Aubrey-Hopkins & James, 2002; Brown, 1993; Wettersten, 1993), propose and develop new courses and programs (Adduci et al., 1990; Brown, 1993), review lesson plans (Adduci et al., 1990), serve on curriculum committees (Adduci et al., 1990), prepare resource materials (Adduci et al., 1990), articulate and relate goals to curriculum (Anderson, 1987), and evaluate and allocate materials (Anderson, 1987). Ritchie et al. (2005) also found that chairs enacted curriculum leadership by filtering external information used in curriculum planning to protect new teachers and to manage resistance of more experienced teachers, guiding curriculum planning, seeking information through external professional networks, supporting ideas from early-career teachers, and encouraging student feedback on curriculum. Duke (1990) reported that chairs perceived the following dimensions as being most important for curriculum leadership: knowledge of subject area content and the curriculum development

process, commitment to teacher involvement in curriculum development, belief that curriculum development is an ongoing process, willingness to address curricular problems, commitment to improving curriculum at the school level, belief in the importance of curriculum, setting goals and objectives, encouraging teacher ownership of the curriculum, and limiting curriculum changes to those that are realistic and substantive.

In order to act as a curriculum leader, a science chair must be familiar with the goals, structure, and content of the national and state curriculum documents that guide classroom practice. These include *A Framework for K-12 Science* Education (NRC, 2012) and the recently released Next Generation Science Standards (Achieve, 2013), as well as state and local curriculum documents. As teachers work collaboratively to transform these curriculum guides into a classroom curriculum appropriate for a particular student population, the chair should serve as a source of information and guidance, encourage active reflection, help teachers solve the problems that arise as the idealized curriculum meets the practical constraints of the classroom, and ensure that curriculum decisions are made in the best interests of students. This role also provides an avenue for chairs to advocate for appropriate science learning opportunities for all students (Bybee, 2006).

Science teaching leadership. Instructional leadership with regard to teaching follows directly from curriculum leadership and can be enacted in relation to the processes of planning instruction, setting instructional objectives, and developing reflective teaching practice (Hoy & Hoy, 2009). As mentioned above, one important leadership strategy for a science chair is to provide a common instructional framework that organizes teachers' collaborative work and provides coherence to the department's instructional program (Marzano et al., 2005). Such a framework may take many forms—such as the 5E learning cycle (Bybee, 2006) or the Content-Understanding-Environment framework (Tweed, 2009)—but should be based on relevant research on student learning in science. Within such a framework, teachers should be prepared to employ a variety of instructional strategies that fit particular contexts.

In order to support teachers' implementation of an instructional framework, the chair must be familiar with and prepared to communicate research on student learning and instructional approaches in

science. The following publications represent a very limited sampling of the types of research with which science chairs should be familiar. The NRC (2005) reviewed and summarized research on student learning in science and concluded that science teachers should incorporate the following three principles into their teaching: (a) science instruction must address students' preconceptions, (b) science instruction must provide opportunities for students to practice inquiry, and (c) science instruction should support the development of metacognition in students. Banilower, Cohen, Pasley, and Weiss (2008) also reviewed key research findings and concluded that effective science instruction promotes student motivation, elicits and builds on students' prior knowledge, promotes intellectual engagement with important science content, encourages students to use evidence to critique claims, and provides students opportunities to make sense of the ideas encountered in each lesson. Research can also inform teachers about specific instructional strategies. Based on a meta-analysis of research published in the U.S. between 1980 and 2004 on the effects of specific teaching strategies on science achievement, Schroeder, Scott, Tolson, Huang, and Lee (2007) identified the following categories of strategies as being effective in improving student achievement in science: enhanced context strategies, collaborative learning strategies, questioning strategies, inquiry strategies, manipulation strategies, assessment strategies, enhanced materials strategies, and instructional technology strategies.

Similar to the situation with curriculum leadership, limited research is available that explicates specific roles that chairs play in leadership related to instruction. Researchers have reported that chairs coordinate instruction within the department (Anderson, 1987), organize teachers to work on instructional matters (Anderson, 1987; Ritchie et al., 2005), establish new instructional programs (Anderson, 1987), conduct demonstration lessons (Adduci et al., 1990), model and provide explicit support for desired practices (Aubrey-Hopkins & James, 2002; Bliss, 1989; Rigano and Ritchie, 2003; Ritchie et al., 2005); provide or highlight onsite expertise (Bliss, 1989), raise the voice of students (Rigano and Ritchie, 2003), introduce new ideas (Ritchie et al., 2005; Wettersten, 1993), facilitate the development of shared units of work (Ritchie et al., 2005), provide resources (Wettersten, 1993), and help develop solutions to classroom problems (Wettersten, 1993). Duke (1990) reported chairs perceived the following dimensions as being

most important for leadership of instruction: knowledge of materials and resources, programs, methods, improvement processes, and effective instruction; commitment to instructional improvement; commitment to high quality instruction; willingness to be involved in improvement efforts; openness to new ideas and practices; supportive of staff involvement in improvement efforts; viewing instruction as first priority; supporting development of individual teaching styles; and engaging teachers in dialogue about instruction.

Conclusion and Implications

Returning to the idea of instructional leadership as development of PCK allows me to draw some conclusions that contribute to an understanding of science instructional leadership. Stein and Nelson (2003) referred to the application of subject matter knowledge in leadership as leadership content knowledge (LCK). From the LCK perspective, an instructional leader must combine knowledge of the subject matter being taught, knowledge of how to teach that subject matter (i.e. PCK), knowledge about teachers as adult learners, and knowledge and skills needed to build a learning community that draws on individual expertise to achieve common goals. The capability of enacting leadership content knowledge is not a result of holding the chair title. Rather, instructional leadership must be enacted through relationships with the teachers within a department. Ultimately, only teachers can improve the instruction in their classrooms; a chair acting as an instructional leader can only work to create a professional environment in which teachers collaboratively make instructional decisions that lead to the best possible learning experiences for the students in their classrooms.

The chair can enact instructional leadership, or stimulate the development of PCK, in three main ways. First, chairs can support and facilitate collaborative planning within a common instructional planning framework. Second, chairs can encourage professional learning and reflection by structuring department meetings as professional learning opportunities. Finally, chairs can act as role models who embody the curriculum-related and instructional attitudes and behaviors that are desired in teachers within the department. Through these activities, the chair should encourage reflection and commitment to serve students' best interests.

Little has been written on the distinctions between curriculum leadership and leadership of instruction. In part, this can be attributed to the fact that the instructional leadership literature focuses on the schoolwide role of the principal rather than the subject-specific role of the chair. It is also true that curriculum and instruction, along with assessment, are inherently intertwined in theory and in practice. While chairs can glean important information from the general literature on instructional leadership, the research findings presented in this dissertation provide greater insight into the particular approaches that effective science chairs employ as they lead the instructional programs in their departments.

Model Building as Theory Construction

Natural scientists have long used models to represent physical phenomena. These models have included physical representations, analogies, mathematical models, and computer simulations. Models help scientists understand and communicate about physical systems that are too complex, too rapidly changing, or too small to be studied directly. Models also constitute an important basis for argumentation in the sciences (Lehrer & Schauble, 2006). Models in the natural sciences range from physical microcosms that bear direct resemblance to the system being modeled to syntactic models that represent the essential features of a system without resembling the system to computer simulations that model exceedingly complex phenomena, such as global warming (Lehrer & Schauble, 2006).

Likewise, social scientists employ models to represent the complex, dynamic, unique, and obscure nature of social systems (Jaccard & Jacoby, 2010). Models of various types regularly appear in educational research literature. In his highly cited handbook for chairs, Sergiovanni (1984) cited a wide range of models from his own and other authors' work. These models presented research on authority, leadership styles, role expectations, teacher motivation, school change, curriculum development, classroom influence, evaluation, and supervision. In the general educational literature, models representing cognitive processing, student motivation, influences on student achievement, or other concepts are common. These models allow researchers to summarize information, illustrate relationships among concepts, and describe causal relationships between factors.

Models may be defined in multiple ways and may display an incredible range of complexity. Models may be as simple as "language assertions about how the world works" (Larkey & Sproull, 1981, p. 235), or they may consist of mathematical formulae, geometric shapes and text, flow charts, or complex computer algorithms. Ultimately, models in the social sciences are analogies that represent complex social systems in some simplified manner (Larkey & Sproull, 1981). These representations may be purely conceptual or they may be associated with mathematical or statistical analyses. Although models are commonplace in the education literature, discussions of the nature and construction of models, particularly in the field of education, are limited. However, there are some key writings that link model building to theory construction in the social sciences.

Kettley (2010) and Jaccard and Jacoby (2010) each pointed out that solid theoretical grounding is often lacking in social science research and provided useful guidance to researchers attempting to generate theoretical models. Social researchers seek to understand and generate explanations about the complex social systems that define our existence. Researchers employ a wide range of methods in collecting and analyzing data and in generating these explanations, which may focus on the meaning constructed by individuals or on the tendencies of large samples of people. In any case, a researcher must ensure that these explanations are grounded equally in empirical data and in social theory.

Although Kettley (2010) argued for a particular research approach, his text, *Theory Building in Educational Research*, provides important guidance for all educational researchers. For Kettley (2010), "theory is the interface of systematic inquiry, including data analysis and interpretation, and the researcher's cognitive ability, which can incorporate components of any social scientific paradigm" (p. 9). Theory building is aimed at explaining social relationships and should transcend paradigmatic boundaries. Further, theory "is made up, invented or built through…creative imagination and personal cognitive ability, which allows the researcher to explore the logical relationships and the causal connections between conceptual abstractions" (Kettley, 2010, p. 9). Jaccard and Jacoby (2010) shared this focus on the centrality of the researcher's cognitive processes in theory formation.

Recognizing that theory construction is ultimately a creative human endeavor removes the mystery from the process and makes obvious the need for researchers to exercise diligence and rigor in developing and communicating theory (Jaccard & Jacoby, 2010; Kettley, 2010). According to Kettley (2010), this diligence and rigor are often lacking in education research. Education researchers commonly justify their topics, methods, and findings, but they "rarely, if ever,…explain their theory building techniques, let alone account for the cognitive processes that resulted in their knowledge-based products" (Kettley, 2010, p. 10). Weaknesses in theory construction are of more than academic significance as weak social explanations of education "almost invariably lead to inappropriate, ineffective or damaging" educational interventions (Kettley, 2010, p. 167).

Jaccard and Jacoby (2010) provided a more general discussion of theory construction and model building in the social sciences, and their work forms the main foundation for this discussion of modeling. For Jaccard and Jacoby (2010), theory construction and model building are identical processes. According to Jaccard and Jacoby (2010), "a theory is a set of statements about the relationship(s) between two or more concepts or constructs" (p. 28), and a model is "any external symbolic representation of an internal conceptual system [i.e. theory]…regardless of whether the representation is verbal, mathematical, pictorial/graphical, or physical" (p. 29). Thus, theory construction and model building involve "formulating conceptual systems and converting them into symbolic expressions" (Jaccard & Jacoby, 2010, p. 28). The concepts and relationships that comprise a model and the model itself are always selective abstractions of social experience rather than social reality (Jaccard & Jacoby, 2010). Beyond simply stating that concepts are related, a theory should provide a deeper level of explanation that attempts to elucidate why the concepts are related (Jaccard & Jacoby, 2010). Jaccard and Jacoby (2010) asserted that the purpose of social theories and models is to assist researchers "in identifying, organizing, and…explaining or predicting some delimited portion of the experienced world" (p. 15).

Constructing Models

Summarizing the construction of theory, Jaccard and Jacoby (2010) stated that "theory construction involves specifying relationships between concepts in ways that create new insights into the

phenomena we are interested in understanding…by invoking concepts and processes that we think influence…or are the basis for" the phenomenon (p. 39). Jaccard and Jacoby (2010) discussed four iterative processes that are involved in constructing a model of a social phenomenon. First, the researcher generates ideas about explanatory constructs, relationships among these concepts, and mechanisms underlying the phenomenon. This is a creative process; as such, the researcher should defer critique of these initial ideas until later in the model-building process. The researcher might generate initial ideas based on a literature review, empirical data, personal experience, or a variety of cognitive heuristics, such as using analogies and metaphors. Second, the researcher scrutinizes the initial ideas, retaining promising ideas and rejecting others. Jaccard and Jacoby (2010) did not provide additional guidance on this step in the process, but presumably the researcher would rely on existing literature, existing empirical data, or theoretical analysis to narrow the initial list of concepts. Third, the researcher focuses and refines the concepts that are selected for inclusion in the model. Jaccard and Jacoby (2010) recommended that researchers engage in a process of instantiation, which "involves specifying concrete instances of abstract concepts in order to help clarify their meaning" (p. 76). Instantiation refines initial theoretical ideas, connects them to the empirical realm, and facilitates communication with other scholars and practitioners. In this process, the researcher uses existing literature, reference materials, or cognitive analyses of concepts to develop clear and concise definitions of each concept included in the model. Concepts are often multi-dimensional, and new theory often involves the creation of novel concepts.

The final process in model construction is clarifying relationships among concepts in the model. Jaccard and Jacoby (2010) recommended using thought experiments to clarify the nature and magnitude of expected relationships between concepts. The researcher should consider that the relationship between two concepts might be moderated by additional concepts. Clarifying these relationships clarifies the logic of the proposed theory. During this stage of model building, the researcher should remember that the goal of producing social explanations requires the researcher to articulate how and why concepts are related. A simple statement that two concepts are related does not constitute robust social theory. Specifying relationships between concepts forces the researcher to consider factors that are external to the model and

may lead the researcher to add additional concepts to the model. As the researcher considers which relationships and concepts to include or exclude from the model, one must keep in mind that models necessarily represent a selective abstraction of reality. This places the onus on the researcher to be deliberate and explicit in making decisions during model construction.

Frameworks for Modeling

Jaccard and Jacoby (2010) discussed four general frameworks—causal models, mathematical models, simulations, and grounded and emergent theories—for modeling in the social sciences, and it is instructive to consider each of these frameworks. Causal modeling is the most prominent mode of theory construction in the social sciences (Jaccard & Jacoby, 2010), and this framework provides an important point of departure for the other modeling frameworks. Therefore, I focus primarily on this framework in the following discussion. Simulations are the least relevant to research in educational leadership, and I consider them only in passing. Simulations are intended to imitate the processes of a targeted system with the goal of building new theory or testing proposed theory. Simulations are best suited for studying complex, dynamic systems, such as a national economy. I did not locate any research utilizing simulations in my review of literature relevant to chair leadership.

Causal models. Causal models focus on specifying cause-effect relationships in which changes in one variable lead to changes in another variable (Jaccard & Jacoby, 2010). While the causal framework is typically associated with positivist, quantitative research, conceptual models developed through qualitative research often imply cause-effect logic, even if the researchers do not emphasize these relationships. Causal models help researchers organize their understanding of the social environment, make predictions about processes within that environment, and suggest changes to those processes. Causal models are often represented as path diagrams in which labeled boxes represent variables and arrows represent the direction of causation. Path diagrams visually summarize theoretical propositions while allowing the reader to "see the broader framework in a unified way" (Jaccard & Jacoby, 2010, p. 169). Each relationship, i.e. each proposition, should be supported by a well-reasoned argument. Path diagrams, especially when constructed as part of correlational or observational research, are often

analyzed through structural equation modeling (SEM), which is discussed below. Alig-Mielcarek and Hoy's (2005) model of math achievement provides an example of a path model that incorporates SEM. In their model, academic press leads to student achievement, but both student socioeconomic status and instructional leadership influence these factors.

Researchers may construct causal models based on literature review, a priori logic, or analysis of empirical data (Jaccard & Jacoby, 2010); in any case, researchers should consider some important features of causality and types of causal relationships when constructing path diagrams. Proposed causal relationships must adhere to the following logical constraints: (a) if variable *A* causes variable *B*, then a change in *A* must lead to a change in *B*; (b) cause must precede effect in time; (c) time between cause and effect may vary; (d) the nature and strength of a causal relationship may vary with context; and (e) cause and effect must be connected spatially or through a series of intermediate events. Within these logical constraints, a researcher should consider the following range of causal relationships when constructing a model. In a direct relationship, the change in one variable is directly related to a change in a second variable. In an indirect relationship, one variable acts through a mediating variable to affect a third variable. A spurious relationship exists when two variables are related because they share a common cause. A relationship is said to be moderated when the relationship between two variables differs based on the value of a third variable. In a bidirectional relationship, two variables influence each other. Finally, an unanalyzed relationship exists when two variables are correlated, but the nature of the relationship is not specified within the model. As will be demonstrated in the discussion of modeling examples below, causal path models are the most common form of modeling employed in studies of educational leadership.

Mathematical models. When variables in a model can be represented by meaningful numerical values, a researcher may choose to construct a mathematical model (Jaccard & Jacoby, 2010). The simplest form of such a model is a linear equation that relates one variable to another. Purely mathematical models, of course, may also involve much more complex formulae and multiple variables. The defining aspect of these models is that some output variable is represented as a mathematical function

of one or more input variables. My literature review revealed very few purely mathematical models. More commonly, mathematical and statistical methods are used to quantify and test causal models, for example when SEM is used to test a theory represented by a path diagram. SEM, which is carried out with the assistance of computer software, models a linear relationship including an error estimate for every pair of variables that are connected by an arrow within a path diagram. Results are displayed as correlation coefficients for each arrow in the path diagram. Additional statistics may be used to test the fit of the model with the collected data, and SEM analysis may lead to revisions in the original model. Multilevel modeling describes another group of mathematical techniques that may be used in conjunction with causal modeling. This is a statistical procedure that allows analysis of explanatory variables nested within different levels. An example might involve analyzing the effect of individual, school, and community variables on student achievement in school. Researchers represent multilevel models in narrative, diagrammatical, or mathematical forms.

Grounded and emergent theory. Jaccard and Jacoby (2010) describe grounded and emergent theory as related approaches in which the researcher builds theory from data rather than using data to test a priori theory. Grounded theory is a sociological approach rooted in the work of Glaser and Strauss, while the emergent theory approach grew out of anthropology (Jaccard & Jacoby, 2010). These approaches share a focus on process-oriented perspectives rather than the variable-oriented perspective of causal modeling. Process-oriented modeling is aimed at describing action and change within a social system. Jaccard and Jacoby (2010) point out that grounded and emergent theorists tend to frame theory as propositions with supporting arguments that should be grounded in empirical data and follow rigorous rhetorical guidelines. While Jaccard and Jacoby's (2010) discussion foregrounds the emergent theory approach, I focus my discussion on grounded theory.

The general approach to generating grounded theory was discussed in the previous chapter, and my specific application of the constant comparative method and grounded theory development will be laid out in following chapters. Here, I wish to situate grounded theory within the more general discussion

of model building as theory construction. Grounded theory corresponds well to the guidelines for theory building discussed above.

The constant comparative method provides an answer to Kettley's (2010) call for researchers to explain the process of theory building. This approach provides a systematic and documented approach to theory building. The grounded theory approach also corresponds to Jaccard and Jacoby's (2010) four processes of theory development. Initial ideas are generated from initial coding of empirical data. Concepts are narrowed and refined through selective coding, comparative analysis, theoretical sampling, and memo writing. These same processes allow the researcher to integrate conceptual categories and their properties. Because the researcher begins with empirical data, the process of instantiation is ongoing throughout the research process. Additional memo writing and integration of theory allows the researcher to clarify relationships among theoretical concepts.

As is so often the case when researchers discuss categories and binary classification, such as quantitative versus qualitative research or modeling frameworks, we must remember that such boundaries are matters of convenience rather than reality. A causal model may be developed based on qualitative data and then tested statistically in further research. A related form of model not discussed by Jaccard and Jacoby is what might be described as a conceptual model, in which researchers construct a model to explicate their conceptual understanding of a construct. This conceptual model may later be employed as part of a causal model or process model, but it may also stand on its own to define a theoretical construct.

Evaluating Models

Jaccard and Jacoby (2010) argued that the primary criterion for evaluating models is their utility, i.e. the extent to which "they serve as useful guides to the world we experience" (p. 31). Beyond this general criterion, Jaccard and Jacoby cite Shaw and Costanzo's (1982, as cited in Jaccard & Jacoby, 2010) nine criteria for evaluating theories. In this view, the first three criteria—internally consistent logic, agree with known data, and testable—are required for acceptance of a theory, while the remaining criteria—understandable and well communicated, parsimonious, consistent with current theories, broad scope, novelty, and generative—are desirable characteristics. These criteria cannot be applied in an

absolute fashion. As examples, novelty and consistency with established theories are conflicting criteria and otherwise weak theories may generate considerable amounts of new research. While acknowledging traditional views of theoretical criteria similar to those laid out by Shaw and Constanzo (1982, as cited in Jaccard & Jacoby, 2010), Glaser and Strauss (1967) argued that the method of theory development is as important as the theory itself. These authors also offered specific criteria for evaluating grounded theory (Glaser & Strauss, 1967). Charmaz (2006) summarized these criteria as "a close fit with the data, usefulness, conceptual density, durability over time, modifiability, and explanatory power" (p. 6).

Kettley (2010) argued that theory should comprise "powerful social explanations" (p. 41) that meet four criteria. According to Kettley (2010), these explanations (a) "must be derived from robust empirical…observations…derived from a methodological framework consistent with the interpretive schemas and theory building strategies used to generate the social explanation" (p. 42-43); (b) "must account for the totality of cases of a phenomenon, in a given spatial and temporal location, and also enable an understanding of individual variations in the experiences constituting the relational whole" (p. 43); (c) "require acknowledgement of the indivisible and continuous qualities of everyday life, because understandings of human relationships should be contiguous with the social structure" (p. 43); and (d) "should transform both the internal procedure of education studies…and the external recommendations provided to teachers, managers and policy-makers" (p. 43).

Larkey and Sproull (1981) addressed a critical issue for education research in their focus on the role of models in relation to social policy. These authors argued that models might be used to understand and suggest improvements to previous policy programs or to predict the consequences of proposed programs. In this context, Larkey and Sproull (1981) argued that models should be compared to competing explanatory models, not simply to null hypotheses. Synthesizing the criteria discussed above, I propose that a theory and associated model should (a) contain internally consistent logic, (b) be grounded in rigorous empirical investigation, (c) be grounded in appropriate social theory, (d) provide a strong social explanation of the phenomenon, and (e) contribute to both educational research and practice.

Limitations of models. While some authors treat modeling and theorizing as identical processes, researchers must recognize some important limitations of models. Summarizing the relationship between modeling and theorizing, Scheerens (1997) stated that "theorizing means going beyond the statement of factors that work and also beyond the modeling of relationships between these factors…in order to lay bare the underlying explanatory principles" (p. 287) at work within a system. Scheerens (1997) concluded that models generally perform the first two functions but may not always accomplish the third function. Thus, Scheerens (1997) argued that models are necessary but not sufficient to constitute theory. Similarly, Harrison (1966) cautioned that while a model may represent the structure of a theory the model does not represent the totality of the theory. Harrison (1966) argued that to use model as a synonym for theory "confuses scientific theory with a part of such a theory" (p. 135). Recognizing that models are inherently flawed representations of real systems, Larkey and Sproull (1981) argued that the ultimate value of models lies in their utility. However, Scheerens (1997) pointed out that an overly pragmatic, empirical approach can lead to research that is atheoretical. Conversely, Kettley (2010) argued that when researchers become preoccupied with particular theoretical frameworks, they often produce explanations that are disconnected from social reality. Therefore, models must be equally grounded in empirical data and existing theoretical literature. Taking these ideas together, a model is properly viewed as a partial representation of a larger theory and not as a theory itself.

Models in educational leadership research. While models of various types are commonplace in the general education research literature, Briggs (2007) argued that models are under-used in educational management research. However, useful examples of modeling do exist in literature relevant to educational leadership. For example, Scheerens (1997) reviewed the development of model-based research on school effectiveness from simple mathematical models to multilevel statistical models that foreground "the interpretation of relationships across levels" (p. 285).

The following examples represent the diversity of approaches to and goals of modeling in research on educational leadership. Barnett (1984) used teacher questionnaires and interviews with teachers and administrators to test an exchange model of teacher power in schools. In this model, which

Barnett (1984) represented in a simple path diagram, subordinate teachers exchange access to resources, such as information, for influence on their superordinate administrators. Rhoton and McLean (2008) presented a conceptual model of their professional development program for science teacher leaders. The model combined organizational and programmatic aspects with output variables (i.e. teacher knowledge gain and student achievement). Lee and Bryk (1989) provided an example of a mathematical model as they presented a hierarchical linear model of the social distribution of high school achievement in Catholic schools. Heck and Moriyama (2010) employed SEM to analyze the effects of school context, composition, and leadership on instructional practices and student outcomes in elementary schools. Heck and Moriyama (2010) argued that their model-based approach represented an improvement over previous school effectiveness research, which had been atheoretical and had focused on single factors rather than interrelationships among factors. These authors concluded that improvement-focused leadership affected instructional practices, which, in turn, affected student outcomes.

Briggs (2007) argued that modeling is particularly appropriate for building theory in qualitative education research, and his work provides an excellent example of modeling based on the grounded theory approach. Briggs (2007) provided targeted guidance for building education management models based on qualitative research, and these guidelines transfer to the study of instructional leadership at the secondary level. As Briggs (2007) indicated, educational leadership involves complex social interactions, and models can help researchers describe and understand these interactions. Briggs (2007) discussed five functions for modeling in such research: (a) representing the complexity of a phenomenon from the perspective of participants, (b) providing a means of further analysis beyond coding data, (c) facilitating theorizing about relationships among factors within a system, (d) providing a basis for prediction, and (e) supporting decision making. In addition to these functions, Briggs also discussed some specific benefits models offer in relation to communicating theory. Visual models organize information and offer a non-sequential alternative to text that allows the reader to interact more readily with the theory. Thus, models facilitate cognitive transfer to new situations; a reader can analyze the fit between the model and other situations with which the reader is familiar. Models also serve as a useful point of discussion or debate

among researchers or practitioners. Briggs argued that modeling is particularly well suited to building generalizations from case studies, and his research exemplifies this approach.

Briggs (2007) conducted four case studies to investigate factors that facilitate and impede the various roles of middle managers in English colleges. Briggs' (2007) research drew on grounded theory and on Miles and Huberman's (1994) focus on visual data displays. Briggs (2007) engaged in an iterative process in which he shifted from literature to empirical data and back while developing his model and theory. Not only did Briggs move back and forth between the literature and his data, but he also moved from specific instances of reality to abstraction of reality through modeling to a generalized theory that he proposes may apply to other instances of reality. This illustrates the iterative nature of modeling and the importance of grounding a model both in theory and in empirical data. As a result of his research, Briggs developed models of five aspects—corporate agent, implementer, staff manager, liaison, and leader—of the middle manager role and synthesized these into an overall model that clearly communicates the complex context in which middle managers enact their role.

Beyond the examples discussed above, the following studies incorporated models that are directly relevant to the development of a model of instructional leadership for high school science department chairs. Alig-Mielcarek and Hoy (2005) conducted a literature review and proposed a path model illustrating relationships among instructional leadership, socioeconomic status (SES) of students, academic press of the school, and student achievement. The researchers then collected data through surveys of teachers and administrators and tested the proposed model through SEM. Results indicated that instructional leadership affected student achievement only indirectly by acting through academic press, and that SES had direct and indirect effects on student achievement. This research supports the assertion that principal leadership acts indirectly through teacher practice rather than directly on student achievement.

Au et al. (2003) proposed a path model theorizing links among chair leadership behaviors, teacher collaboration, and perceived student performance in site-based management schools in Hong Kong. The researchers collected survey data from administrators, chairs, and teachers, and constructed SEMs based

on the perceptions of each group and based on the overall perceptions of all participants. The authors claimed that SEM allowed them "to examine, measure, and model ways in which a range of possible intermediate leadership effects might relate to a final outcome variable" (p. 483). The overall model provided new insights and identified relationships that were considerably more complex than those in the hypothesized model. A comparison of individual models based on the three participant groups revealed that administrators held more linear views and teachers held more complex and reciprocal views of chair leadership. As such, the authors suggested that future research on chair leadership should take greater account of teachers.

Gurr et al. (2006, 2007) used case studies of Australian principals to develop separate and combined models of instructional leadership. Before discussing the models, it is instructive to consider the authors' objectives. In discussing one of the preliminary models based on a case study in Victoria, the authors identified the following three objectives.

1. to *describe*, *explain* and *categorize* the various kinds of leadership interventions and *outline* their relationship and impact on student outcomes;
2. to provide a *conceptual map* of the interventions used by the principals;
3. to provide a *framework for other practitioners* to use as a guide to future action. (pp. 384-385, emphasis added)

These objectives illustrate some of the functions that models can serve in research on instructional leadership. Ultimately, these authors combined models from their individual case studies into a general model of instructional leadership that specified three levels—external context, principal and school, and teaching and learning—of factors that influenced outcomes. The model represented the finding that principals exerted a strong, but indirect influence on student learning, and the complexity of the general model provided a stark contrast to typical representations that focus exclusively on core principles of instructional leadership.

Hoy et al. (2006) presented a model of a construct, academic optimism, that is closely related to instructional leadership. Their triangular conceptual model illustrated that academic optimism consists of

the three interrelated dimensions of academic emphasis, collective efficacy, and faculty trust. The model included arrows pointing in both directions between each pair of dimensions to represent the reciprocal causal relationships among the dimensions. Following this conceptual model, the researchers presented a hypothetical path model with academic optimism, urbanicity, SES, and previous student achievement as input variables for the outcome of student achievement. Within the path model, the authors hypothesized that SES and previous achievement would operate directly and indirectly through academic optimism. SEM based on survey data from 96 high schools supported the hypothesized path model for achievement in the areas of science, mathematics, reading, writing, and social studies.

Based on a review of empirical research that linked aspects of instructional leadership to student outcomes, Robinson (2010) proposed a model of leadership capabilities that contribute to instructional leadership. The notion of more holistic leadership capabilities provides an alternative to the long lists of knowledge, skills, and personal characteristics that are common in other studies of instructional leadership. Interestingly, Robinson was able to identify only three studies that met her criteria for relevant empirical evidence combined with strong theoretical arguments. In Robinson's model, effective instructional leadership comprised the three interrelated capabilities of building relational trust, integrating educational knowledge, and solving complex problems. Within her article, Robinson also reprinted a detailed model of the relational trust from Bryk and Schneider (2002, as cited in Robinson, 2010) that emphasized the complexity of leadership processes.

Robinson's (2010) inclusion of integrating educational knowledge, or leadership content knowledge (LCK), as a capability in her model of instructional leadership connected to two other models that influenced my thinking about science instructional leadership. The first is Stein and Nelson's (2003) model of LCK. Stein and Nelson (2003) define LCK as the "knowledge of academic subjects that is used by administrators when they function as instructional leaders" (p. 423), and they argue that LCK is enacted within nested learning communities represented by a model adapted from Brown and Greeno (1999, as cited in Stein & Nelson, 2003). The model is composed of a set of four nested ovals with the innermost oval representing subject matter. Within the fist community, students and teachers interact

with the subject matter. Within the next community, principals and teachers interact in learning that considers the students, the act of teaching, and the subject matter. The largest community includes district administrators and adult professionals. At each level, the teacher or leader must have knowledge of what is to be learned along with knowledge of how best to facilitate learning for the targeted group—LCK is the combination of these forms of knowledge. Stein and Nelson based their conceptualization of LCK on cross-case analysis of case studies of one principal and two district-level administrators. Stein and Nelson also drew heavily on Shulman's (1986) concept of PCK, and this connection led me to examine Park and Oliver's (2008) model of science PCK.

Park and Oliver (2008) used a theoretical analysis of previous literature, including Shulman's work, on PCK as the basis to develop a conceptual model of PCK for science teaching. Park and Oliver's definition of PCK centered on *"teachers' understanding and enactment* of how to help a group of students understand specific subject matter" (p. 264, emphasis in original), and their initial model incorporated five components of PCK: (a) orientations to science teaching, (b) knowledge of students' understanding in science, (c) knowledge of science curriculum, (d) knowledge of instructional strategies and representations for teaching science, and (e) knowledge of assessments of science learning. In particular, Park and Oliver's model draws directly on Grossman's (1990, as cited in Park & Oliver, 2008) model of knowledge bases for teaching. After developing the model, Park and Oliver conducted case studies with three high school chemistry teachers. During the case studies, the initial model "served as a heuristic device and as an organizational tool for the observable components of PCK" (p. 264). Based on the findings from these case studies and supported by existing literature on the construct, the researchers added a sixth component, teacher efficacy, to the model. In addition to these six components, the final model included potential sources for each component from within the instructional setting and illustrated the integration of PCK through reflection-in-action and reflection-on-action. The final product is quite complex but represents an effort to present a holistic picture that can facilitate communication among researchers and practitioners regarding a construct, PCK, that is difficult to define.

While chairs hold a formal title within schools, the position shares some important features with informal teacher leaders. Therefore, York-Barr and Duke's (2004) literature review and conceptual framework for teacher leadership was also useful in my work. After reviewing two decades of scholarship on teacher leadership, York-Barr and Duke synthesized this work to develop a conceptual framework for teacher leadership. The authors represented their framework in a conceptual model that addressed the necessary conditions, means of influence, targets, and intermediary outcomes of teacher leadership. The model culminated with student learning as the overall outcome. This model represents the authors' first steps toward addressing the lack of theoretical work in the field of teacher leadership, and the model is followed by a number of recommendations for future research.

Bolam, Tuner, and colleagues' work over at least a decade included developing a model of chair leadership in the United Kingdom. Turner (1996) presented a simple conceptual path model illustrating the categories of factors that affect the chair's leadership of teaching and learning. The model was based on a literature review and on a previous model proposed by Bolam, McMahon, Pocklington, and Welding (1993, as cited in Turner, 1996). In 1998, Turner and Bolam argued that contingency theory provided an appropriate theoretical framework for the study of chair leadership and proposed a provisional model that expanded greatly on Turner's (1996) model. Bolam and Turner (2003) then used surveys and interviews with chairs and teachers to verify and refine the model, which was also presented in Turner's (2003) literature review. The model identified eight sets of factors—national/local, school, subject, departmental, personal characteristics, tasks, methods, and teaching/learning outcomes—that influence a chair's leadership practice.

Finally, Wettersten (1993, 1994) built on Barnett's (1984) earlier work to develop an exchange-based model that illustrated how chairs influence teachers and administrators by providing resources or services to each group. Wettersten based her model on her case studies with four high school chairs who she identified as exemplary instructional leaders. Wettersten's model is very effective in visually demonstrating the chairs' position as a bridge between teachers and administrators.

The examples discussed above represent important theoretical content that is pertinent to the research presented in this dissertation, but they also illustrate many of the general applications of modeling in education research. Several of the models represent sets of hypotheses to be tested through SEM or other forms of mathematical modeling. Others are based on literature reviews, and represent researchers' attempts to consolidate or propose innovations in theory for a particular domain of research. Various models represent either a guide for or the product of qualitative or quantitative research. A model may also represent the planning or documentation of a particular educational intervention. Finally, some models discussed above define or clarify new or existing theoretical constructs. Taken together, these examples demonstrate that modeling is a powerful tool to analyze data, build theory, and communicate ideas related to instructional leadership.

Literature-based Model of Science Instructional Leadership

After reviewing more than 175 articles, chapters, and dissertations on chairs, instructional leadership, and science education leadership, I sought to synthesize this research into a form that would guide my research and provide some guidance to practicing science chairs. Many authors have published long lists of knowledge, skills, dispositions, and activities that were observed in or suggested for educational leaders at various levels including chairs. These lists, however, quickly become unwieldy and loose any appeal as useful guidance for a researcher or a practicing instructional leader. Further, Kennedy (2010) suggested that researchers typically overestimate the influence of personal characteristics in studies of teacher quality and that "it is what teachers actually *do* that is most relevant to student learning" (p. 591, italics in original).

Extending this notion to instructional leadership and recognizing that "school leadership involves a seamless and dynamic integration of knowledge, skills, and personal qualities" (Robinson, 2010, p. 3), I combined Robinson's (2010) concept of leadership capabilities with a constant comparative approach to qualitative coding (Charmaz, 2006) to guide the process constructing the model presented below. Taking the lists of knowledge, skills, dispositions, and activities as initial codes, I began the process of collapsing these initial codes into more focused codes and then into conceptual categories equivalent to the core

leadership capabilities contributing to science instructional leadership. The analytic process led to the model of science instructional leadership for high school department chairs presented in Figure 2.1.

This model takes into account the knowledge, skills, dispositions, and activities suggested by many authors, but the leadership capabilities focus attention on the major activities required for successful science instructional leadership. Following Robinson's (2010) argument, the leadership capabilities below should be viewed as inclusive and interdependent. None of these capabilities exist in isolation; each one interacts with and depends on the others. Below, I highlight the key aspects of each capability. Table 2.7 follows the descriptions of these capabilities and summarizes the key contributions of existing literature to the model.

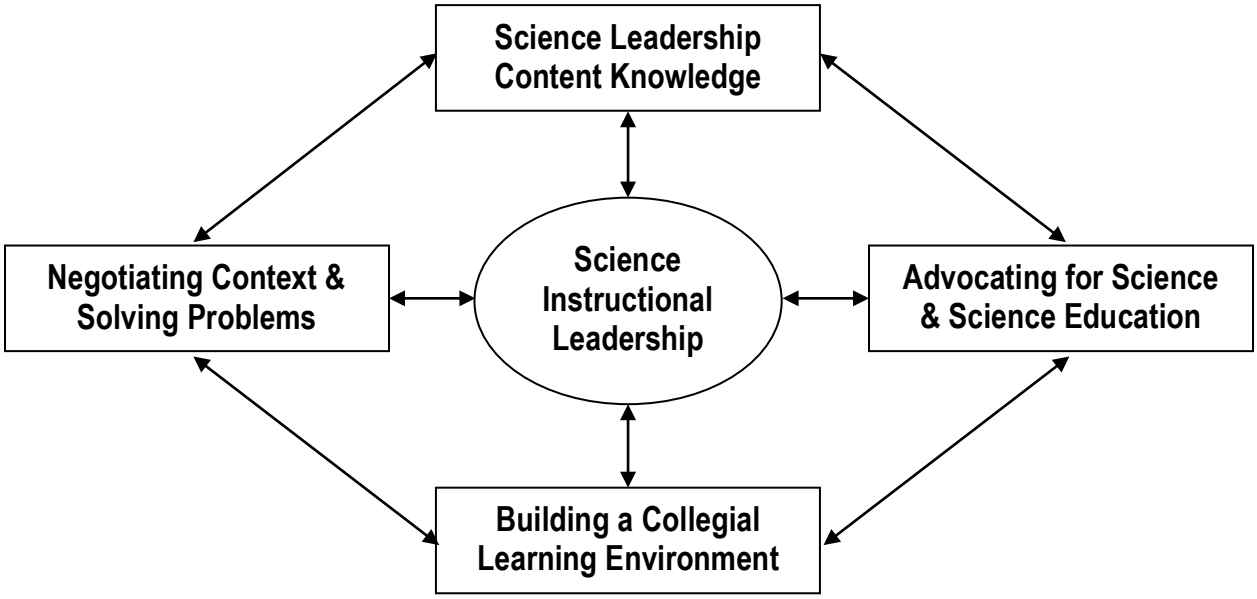

Figure 2.1. Conceptual model of leadership capabilities contributing to science instructional leadership.

Science leadership content knowledge. This capability draws directly on Park and Oliver's (2008) conception of PCK for science teaching and is supported by Stein and Nelson's (2003) work on

LCK. The key features of PCK are a cycle of integration and reflection combined with understandings of curriculum, instruction, assessment, and student learning in science (Park and Oliver, 2008). Instructional leaders must possess a deep knowledge of teaching and learning in the relevant subject matter as well as the ability to facilitate teachers' development of subject-specific PCK (Stein and Nelson, 2003). The science PCK capability also incorporates Bybee's (2006, 2010) notion of centering on the educational core. If a chair hopes to be an effective instructional leader, then the chair must judge every decision against the criterion of improving student learning in the science classroom (McGuigan and Hoy, 2006). Many authors address aspects of curriculum, instruction, and assessment that comprise the educational core. An effective instructional leader must have expertise in content, inquiry and nature of science, pedagogical content knowledge, advanced instructional strategies, curriculum development, the processes of student learning, and the design of appropriate assessments, among other areas.

Advocating for science and science education. The primary goal of any science education leader should be "to make sure that all students have adequate and appropriate opportunities to learn science" (Bybee, 2006, p. 149). Beyond this, science education leaders should serve as advocates for science as an important way of understanding the natural world and for the public understanding of the nature and major concepts of science (Bybee, 2006, 2010). This capability encompasses the notion of orientation to science teaching included in Park and Oliver's (2008) model of PCK and Gess-Newsome and Austin's (2010) recommendation that science education leaders act as advocates for science learning and for science teachers. This capability also encompasses the chair's role in advocating for science curriculum and instructional reforms.

Building a collegial learning environment. Hallinger (2005) echoes many other authors in stressing the importance of building a collaborative learning community that has a shared focus on continuous improvement of student achievement. Printy (2008) suggests that effective learning communities encourage teachers to take responsibility for all students' learning and to adopt reform-based instruction and that chairs play an important role in shaping these communities. Stein and Nelson (2003) incorporate facilitating student and teacher learning communities into their LCK model. Chairs should

strive to create a learning environment that builds academic emphasis and collective efficacy among teachers (Hoy et al., 2006) and that supports and empowers teachers. Chairs should act to influence school structures with the goal providing teachers with the assignments, resources, and time needed to be successful with their students (McGuigan and Hoy, 2006; Horng and Loeb, 2010). An important aspect of this approach is shielding teachers from unnecessary administrative tasks that divert time and attention from instruction. In certain situations, teachers may also require direct support through instructional supervision, mentoring, or coaching.

Negotiating context and solving problems. A science chair must act within a complex political, social, and economic context influenced by national, state, and district policies (Bybee, 2010). Ultimately, though, effective instructional leadership depends on negotiating productive interpersonal relationships (Marzano, 2003) in an environment of distributed leadership (Spillane et al., 2001; Ritchie, 2006). The relationship with the school principal is of particular importance as the chair position is ultimately an extension of administration and given the principal's key role in supporting teacher leadership (Landel and Miller, 2010). Support from the principal is essential to effective instructional leadership in the chair role. Relationships within the school and with parents and students must be characterized by trust, respect, and a sense of working for a collective benefit (York-Barr and Duke, 2004; Ritchie, 2006, Hoy et al., 2006; Glickman et al., 2010; Robinson, 2010). Within the complex local school context, the chair constantly encounters problems large and small. The chair must take a creative and practical approach that draws on individual and collective resources to solve each problem (Robinson, 2010). Across these four leadership capabilities, chairs can lead primarily through modeling and example (Hallinger, 2005; Hoy et al., 2006), but informal leadership is strengthened by perceived expertise, interpersonal skills, and access to needed resources (Printy, 2008; York-Barr and Duke, 204).

Table 2.7

Summary of Leadership Approaches Contributing to Science Instructional Leadership Model

Leadership Approach	Key Concepts	References
Leadership Capabilities	• Integration of knowledge, skills, and personal attributes • Leadership content knowledge • Solving complex problems • Building relational trust	Robinson, 2010
Instructional Leadership	• Supporting a shared sense of purpose and a culture of high expectations and continuous improvement • Leading through modeling desired values • Focus on student achievement	Hallinger, 2005
Pedagogical Content Knowledge	• Understanding, enactment, and reflection • Orientation to teaching science • Teacher efficacy • Knowledge domains for science teaching and learning: assessment, instructional strategies, students' understanding, curriculum	Park & Oliver, 2008
Leadership Content Knowledge	• Knowledge of teaching and learning of subject matter in the classroom • Knowledge of teaching and learning at the school level • Knowledge of how to facilitate student and teacher learning communities	Stein & Nelson, 2003
Academic Optimism	• Academic emphasis • Collective efficacy • Faculty trust in parents and students • Leading through modeling and example	Hoy, Tarter, & Hoy, 2006
Educational Core	• Curriculum, instruction, and assessment • Understanding of student learning in science • Continuous professional learning • Inquiry orientation • Enhancing learning through student-teacher interactions	Bybee, 2006, 2010
Advocacy for Science	• Introducing international perspectives • Support teachers' understanding of scientific inquiry and the nature of science • 21st-Century challenges (achieving scientific literacy and science education reform, teaching science as inquiry, improving teacher knowledge and skills, and improving student achievement) • Recognizing and addressing political realities	Bybee, 2006, 2010

	• Advocating for science learning • Advocating for the science teacher • Understanding the research base and goals of science education reforms • Developing communities of support for science teachers	Gess-Newsome & Austin, 2010
Communities of Practice	• Department chairs shape opportunities for teachers to learn by serving as agenda setters, knowledge brokers, and learning motivators in communities of practice • Informal leadership emerges as a result of an individual's expertise, interpersonal skills, or access to resources • Productive communities of practice encourage teachers to take responsibility for all students' learning and to adopt reform-based instruction	Printy, 2008
Teacher Support	• School structures that enable teaches to do their jobs more effectively support academic optimism • Leadership decisions based on how decisions affect teaching and learning	McGuigan & Hoy, 2006
Leadership Context	• School leaders should incorporate an organizational management perspective • Collegial model of leadership	Horng & Loeb, 2010 Glickman, Gordon, & Ross-Gordon, 2010
Distributed Leadership	• Collective leadership through interpersonal relationships • Role of science department chairs in distributed leadership (culture of trust and respect, working for collective benefit, cogenerative dialogues, and building solidarity) • Distributed cognition & activity networks	Marzano, 2003 Ritchie, 2006 Spillane, Halverson, & Diamond, 2001
Teacher Leadership	• Key role of principal in supporting teacher leadership • Focus on classroom practice • Conceptual framework • Need for empirical research • Means of leadership influence: maintaining focus on teaching and learning, establishing trusting and collaborative relationships, and exploiting formal and informal interactions	Landel & Miler, 2010 York-Barr & Duke, 2004

Conclusions and Implications

A grounded approach to model construction as well as the preliminary model described above formed important parts of the conceptual framework for my study, but this preliminary model did not represent theory to be tested in my study. Rather, after generating a substantive theory grounded in my empirical data I will incorporate relevant literature into my comparative analytic approach to generate a higher-level theoretical model of instructional leadership as it is enacted by high school science chairs.

The use of modeling in theory construction offers valuable benefits and presents important limitations. Briggs (2007) stated that models highlight "underlying patterns and concepts" (p. 600) at the expense of "the detail of the 'lived experience'" (p. 599). The combination of modeling and narrative analysis presented below highlights both the patterns and the details of the instructional leadership experience of high school science chairs in a manner that contributes to the theoretical literature and to professional practice.

Chapter Summary

The role ambiguity, role conflict, and institutional constraints that provide obstacles to the instructional leadership practice of high school chairs are well documented throughout more than a century of research. Missing from the literature is the story of how effective chairs actually accomplish the role of instructional leadership within the specific context of science education. The respective literatures on instructional leadership and science education leadership can inform inquiries into science instructional leadership, but a direct investigation of the leadership capabilities and approaches of successful science chairs is needed to provide a fuller theoretical understanding and guidance for practicing science chairs.

CHAPTER 3

NEGOTIATING SCIENCE INSTRUCTIONAL LEADERSHIP: A DESCRIPTIVE SURVEY OF HIGH SCHOOL DEPARTMENT CHAIRS' PRACTICE[1]

[1] Peacock, J.S. To be submitted to the *Journal of Science Education and Technology*.

Abstract

High school department chairs are in prime position to provide instructional leadership in science, but this role is not well understood and not well used within schools. Lack of time and authority and role conflict and ambiguity all limit chairs' effectiveness. Thus the current study presents the results of a survey focusing on the leadership contexts and instructional leadership practices of high school science department chairs. A total of 146 science chairs from public high schools across Georgia responded to a combination of selected- and open-response items examining to what extent and how chairs work within existing limitations to provide instructional leadership within their departments. Quantitative and thematic analysis of survey responses led to a conceptual model in which chairs defined their role as instructional leaders as they negotiated a range of supporting and limiting factors within their school contexts and as they prioritized instructional leadership among other duties. Findings of this study underscore the potential value of providing chairs with sufficient time to complete important instructional duties. Further, the model of instructional leadership presented provides a roadmap of how chairs build on supports and negotiate limitations to enact leadership within science education.

Keywords: department chair, instructional leadership, science education, high school, survey, conceptual model

Introduction

As science educators face shifting standards and contexts, there is a constant struggle to improve teaching, learning, and student achievement. Given their position at the nexus of the science education field, a school-based community of science teachers, and school improvement efforts (Melville, Hardy, & Bartley, 2011), science department chairs are in prime position to support instructional improvement within high school science classrooms. In fact, authors in educational leadership argue that department chairs represent an important resource for facilitating the improvement of teaching and learning (Printy, 2008), in general, and the implementation of science education reforms (Melville et al., 2011), in particular. Unfortunately, the department chair's instructional leadership role is not well understood, and chairs have been underused in this capacity (Weller, 2001). While the instructional leadership role of

chairs has not been fully explored in the literature, our understanding of the specific role chairs play as instructional leaders in science is even more limited.

Problem Statement and Research Question

An empirical answer to the question of how science department chairs can effectively serve as instructional leaders for the teachers in their departments represents a gap in the science education literature. Thus the purpose of this study was to understand and to inform the professional practice of high school science department chairs in the role of instructional leadership. The following research question guided the investigation: How do high school science department chairs in Georgia (U.S) enact the role of instructional leadership?

Conceptual Framework

The conceptual framework for this study emerged from the existing literature on department chair practice, instructional leadership, and science education leadership. For the purpose of this study, instructional leadership is defined as any effort taken by a department chair to influence teachers' decision making and practices in regard to curriculum, instruction, and assessment with the goal of improving student learning in science. This definition draws on the instructional leadership literature that focuses on school principals (e.g., Hallinger, 2005), but the definition acknowledges the closer connection chairs have to teachers and classroom practice.

Across more than a century of scholarship—beginning with Meriwether's (1910) report—on the high school chair, there is consensus among administrators, chairs, and teachers that instructional leadership and school improvement should be the chair's primary role. Unfortunately, there is also consensus that schools are not utilizing department chairs to their full potential within this role for a variety of reasons. For example, Zepeda and Kruskamp (2007) reported that chairs' efforts to provide instructional supervision were limited by role conflict and ambiguity, insufficient professional learning, and lack of time and emphasis. On the other hand, there is evidence that when chairs are afforded appropriate resources and professional learning along with a supportive school leadership climate, chairs can effectively enact instructional leadership through practices that focus on collegiality, collaboration,

and social interaction (Au, Wright, & Botton, 2003; Printy, 2008; Ritchie, Mackay, & Rigano, 2005). Further while department chairs face many similar challenges, the literature indicates that each academic subject presents unique challenges and issues (James & Aubrey-Hopkins, 2003; Turner, 2003).

Several studies (Skinner, 2007; Willis, 2010; Zepeda & Kruskamp, 2007; de Lima, 2008; Ritchie et al., 2005) demonstrate that chair leadership is highly context dependent and negotiated through ongoing social interactions with teachers, administrators, and other stakeholders. These studies indicate the need to move beyond the theoretical perspective of Role Theory to explore chair leadership from an interactionist perspective. Further, O'Neill (2000) suggested more than a decade ago that narrative methods offered an ideal tool to understand and enhance chairs' work; unfortunately, few researchers have taken up this suggestion. A few researchers (Au et al., 2003; Bolam & Turner, 2003; Wettersten, 1993,1994) have proposed conceptual models describing chairs' work, but this area of research is underdeveloped. Such conceptual models may be important in unifying research on department chairs and in informing their professional practice. This study draws on these themes from the existing literature and continues a long tradition of survey-based research in the field. However, the design and analysis of the survey instrument and data certainly incorporated the interactionist perspective that was lacking in previous surveys of high school department chairs.

Research Design and Methodology

In order to answer the research question presented above, I conducted an online, descriptive survey of instructional leadership contexts and practices of public high school science department chairs in Georgia. The following sections detail the design, implementation, and analysis of the survey.

Participants

The survey targeted science department chairs at regular public high schools in Georgia. I identified schools by searching the National Center for Education Statistics (2011) online database, and I obtained chair email addresses from online staff directories or by contacting individual schools. This search identified 396 schools, but 35 of these schools did not have science department chairs. Twelve schools were either too small for a chair or were between chairs at the time of contact. One large, urban

district with 23 high schools was excluded from the study, because the district had replaced science chairs with school-based science instructional coaches without teaching responsibilities. Thus, these professionals were acting under a different set of parameters than department chairs. Department chair contact information could not be obtained for five schools, and 14 schools had co-chairs. Thus, I distributed the online questionnaire by email to 369 department chairs at 355 schools throughout the state. Responses were collected from April through June of 2012, and reminder emails were sent in May and June. A total of 146 chairs completed the survey for a response rate of nearly 40%.

Chairs responding to the survey had a median 17 years teaching experience and 5 years experience as chairs. Respondents led departments that ranged from 2 to 35 teachers with a median of 9. Although respondents generally taught multiple grade- and course-levels, chairs were more likely to teach upper grades and higher-level courses. Sixty-six percent (66%) of respondents reported teaching 11th grade and 74% taught 12th grade. Chairs were most likely (87%) to teach advanced-level courses, while only 30% of chairs reported teaching remedial or special education collaborative classes. Table 3.1 summarizes the highest degrees attained by respondents, and Table 3.2 and 3.3 summarize chairs' responses regarding school setting and student population size.

Table 3.1

Highest Degree Attained by Survey Respondents

Highest Degree	%
Bachelor	9.6
Master	52.1
Specialist	26.7
Doctorate	10.3

Table 3.2

School Setting Reported by Survey Respondents

School Setting	%
Rural	41.8
Suburban	42.5
Urban	15.1
Not Reported	0.7

Table 3.3

Size School's Student Population Reported by Survey Respondents

Number of Students	%
<500	8.2
501-1000	19.9
1001-1500	35.6
1501-2000	22.6
2001-2500	5.5
>2500	8.2

Instrument

The questionnaire included 36 selected- or open-response items addressing school context, teaching assignments, roles and responsibilities, compensation, release time, involvement in instructional decision making, instructional leadership practices, supporting and limiting factors, chairs' path to the position, and demographics. As discussed below, the questionnaire design drew on existing literature both in item content and construction. Appendix A provides the full questionnaire and a concept map identifying concepts targeted by each item and documenting links to existing literature.

Building on previously noted suggestions that department chair research should incorporate narrative and other qualitative methods that account for the contextual and social nature of chairs'

practice, the questionnaire incorporated opportunities for participants to provide open-ended accounts of their instructional leadership practice. The items were intended to elicit more detailed information from respondents and to allow for responses that might not be captured in forced answer choices. These open-response items were paired with forced-response items addressing the same concepts and were placed first in these pairs to lessen the influence that forced-response choices might have had on open responses.

Existing literature on department chairs and instructional leadership informed the content of survey items intended to probe how chairs work within their school contexts to enact instructional leadership in science. Items related to chairs' role in instructional decision making and chairs' ideal image of their role were adapted from Adduci, Woods-Houston, and Webb's (1990) interview study of chairs' role ambiguity and role strain. A set of Likert-type items in which chairs rated the relative importance of instructional leadership practices included practices reported in 16 studies, which are cited in Appendix A. Beyond these specific studies, items addressing school context, factors supporting and limiting instructional leadership, and chair demographics were influenced by themes identified in an extensive historical review of the literature on the high school department chair (Chapter 2).

Data Analysis and Representation

Selected-response items were analyzed quantitatively through descriptive statistics to provide a broad view of science department chairs and their instructional leadership practices. Open-ended items were analyzed through the constant comparative method (Charmaz, 2006) with the goal of developing a visual conceptual model (Maxwell, 2005) that might inform professional practice and future research in the field. This involved three levels of coding and analysis. During initial coding, I conducted detailed open coding within each set of open responses with the goal of identifying and marking individual units of meaning. Each unit consisted of a single word, phrase, sentence, or short passage and might have been marked with one or multiple codes. I generated codes by comparing units of meaning and focused on actions by coding primarily with gerund phrases (Charmaz, 2006). During focused coding, I iteratively compared initial codes by working through the code list and constantly referring back to the data supporting the initial codes with the goal of synthesizing larger segments of data (Charmaz, 2006). These

comparisons led me to merge equivalent codes, rename codes, recode segments of data, and add descriptive notes to codes. I also compared these emerging codes to the literature-based practices incorporated into the questionnaire. Where such substitutions were supported by the underlying data, I substituted these concepts for existing codes. I then compared and integrated the focused codes to generate conceptual categories that connected the data to my emerging conceptual model (Charmaz, 2006). I used the graphical network application in Atlas.ti (Muhr, 2010) to sort existing codes into coherent clusters and to generate a visual concept map (Maxwell, 2005) for the overall model. After reviewing the descriptive notes for the underlying codes, I developed the narrative explanations for the conceptual categories and overall model.

Trustworthiness and Limitations of the Study

As a largely descriptive study, the primary goal of this work was to provide a foundation for future research. Additional work might target relationships among specific variables identified in this study or examine chairs' practice in greater depth through qualitative methods, such as case studies or interviews. Efforts were made, though, to ground the current work in existing literature in order to address contextual factors and practices that were likely to resonate with practicing chairs. Regarding the population of participants, the survey targeted a large sample of chairs across the state of Georgia. However, contexts vary across states, and similar work in other states might reveal slightly different areas of emphasis. Also, chairs who have particular interest in instructional leadership may have been more likely to respond to this survey. Therefore, the survey may over-represent the role of instructional leadership in the typical chair's daily activities. In fact, a majority of respondents indicated that student learning (74%) and school leadership (77%) motivated their desire to become chairs. Thus, this sample of chairs may possess a greater focus on instructional leadership than the general population. However, this is consistent with the goal of informing both the practice of chairs who seek to enact instructional leadership for the purpose of improving science education and policies of school and district leaders who seek to foster chair leadership.

Findings

The primary finding of this study is that science department chairs define their role as instructional leaders as they negotiate a range of supporting and limiting factors within their school contexts and as they prioritize instructional leadership among other duties of the chair position. Chairs carry out this leadership through a range of diverse leadership practices, which can be grouped into coherent leadership capabilities. Table 3.4 presents a code table showing the focused codes (bulleted in table) and conceptual codes (bold in table). Focused codes are listed in descending frequency order. The left column displays the specific limiting and supporting factors that chairs cited, and the remaining columns display the leadership practices (focused codes) and the leadership capabilities (conceptual codes) into which I integrated those practices.

Figure 3.1 presents the conceptual model representing chairs' practice in negotiating their particular leadership contexts and working to enact instructional leadership within those contexts. This conceptual model provides the framework for the following discussion of findings from the survey. The following sections explain the properties of each component in the model, as well as the relationships among those components.

Table 3.4

Code Table Showing Conceptual (Bold) and Focused (Bulleted) Codes Generated from Open-Response Survey Items

Factors Limiting Instructional Leadership	**Acting as Liaison**	**Leading & Facilitating Collaboration**
• Time for instructional leadership • Administrative support • Limited or no role as an instructional leader • Participating in decision making • Autonomy and authority to lead department • Fulfilling managerial duties • Working with limited budget • Conflicting or changing policies and curriculum standards • Relying on other instructional supports • Professional learning • Compensation • Resistant teachers • Open communication • Access to other science teachers • Teacher and student transience • No direct route to administrative positions	• Connecting department and administration • Meeting and maintaining communication • Participating in a school leadership team • Listening to teachers • Informal consulting with administration • Building relationships • Gaining teacher buy-in	• Collaborating within the department • Collaborating within course teams • Collaborating with other department chairs • Collaborating with district coordinator
	Focusing on the Educational Core	**Sharing Leadership**
	• Using assessment data and student work • Implementing state and district curriculum standards • Focusing on instructional leadership • Guiding pedagogical decision making • Sharing instructional information and resources • Relying on teacher professionalism • Focusing on student learning • Responding to high stakes testing	• Facilitating shared decision making • Participating in decision making • Autonomy and authority to lead department • Contributing to school improvement initiative • Participating in district-level decisions

Factors Supporting Instructional Leadership	Maintaining Department Culture	Leading Through Managerial Duties
• Administrative support • Participating in a school leadership team • Participating in decision making • Autonomy and authority to lead department • Teacher support and professionalism • Collaborating with other department chairs • Fulfilling school expectations and culture • Professional learning • Relying on other instructional supports • Open communication	• Supporting teachers • Modeling expected practices • Teacher support and professionalism • Setting and maintaining goals and expectations • Problem solving • Fulfilling school expectations and culture • Promoting a collegial environment • Maintaining a supportive environment • Promoting a common vision, mission, and goals	• Providing input on scheduling • Monitoring departmental activities and performance • Ordering classroom materials • Participating in hiring • Preparing departmental budget **Leading Professional Learning** • Planning and implementing professional learning • Providing feedback based on classroom observations • Mentoring and supporting new or transitioning teachers • Participating in professional learning • Participating in a Professional Learning Community • Encouraging reflective practice

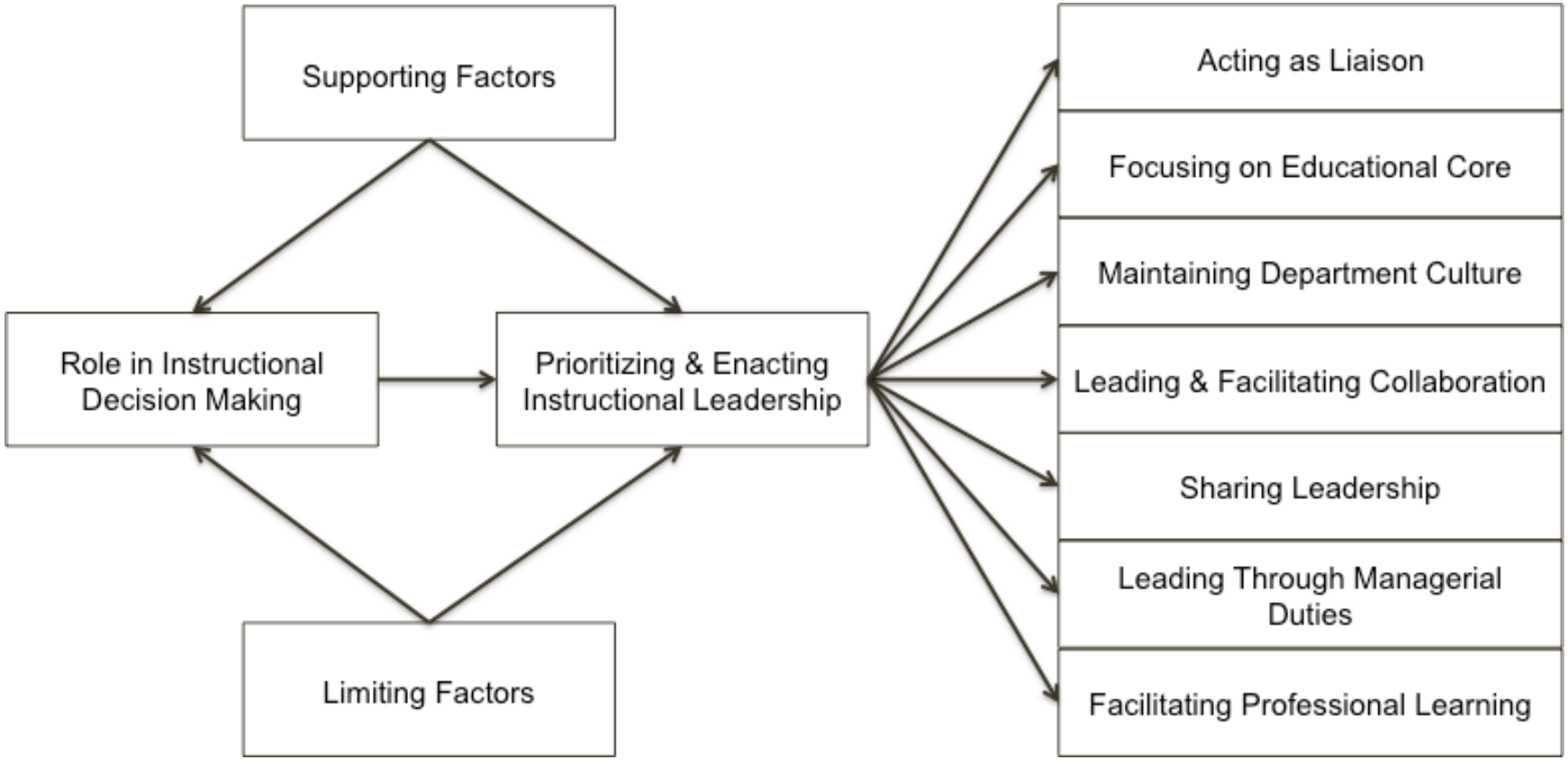

Figure 3.1. Model of high school science department chairs' instructional leadership practice.

Leadership Context

The school context is obviously important in determining chairs' instructional leadership role, but chairs reported different approaches to negotiating this context. For some chairs, administrative expectations that limited their role as instructional leaders were accepted at face value ("This is the culture in the building where I am working. Teacher leadership is not cultivated or encouraged."), while other chairs reported a more active role in defining their role as instructional leaders ("I set a tone so that [principals] know I care and I am willing to go to bat for my teachers and students.").

Supporting and limiting factors. These factors shaped the school context and influenced both chairs' role in instructional decision making and the instructional leadership practices they enacted. Table 3.5 provides the percentages of respondents who selected various supporting and limiting factors in forced-response items. Time and administrative support were clearly the most important factors within the school context. The vast majority (87%) of chairs selected time as a factor that limited instructional leadership. Even some of the 17% of chairs who received release time to complete their duties reported time to be a limiting factor. Administrative support for the department chair was reported variously to serve as a limiting or supporting factor. Job expectations (27.7%), school culture (20.6%), and principal leadership (19.9%) were the most commonly selected limitations after time. These results were supported by open-ended responses such as, "I do not believe that administrators see department chairs as instructional leaders." However, 65.2% of respondents selected principal leadership as a supporting factor, and school-level administrative support was the most often reported supporting factor in open-ended responses. As one chair stated, "My principal and assistant principals trust me to handle complex situations and trust me as an instructional leader."

Table 3.5

Percentage of Chairs Selecting Specific Factors Supporting or Limiting Role as Instructional Leader

Supporting Factor	%	Limiting Factor	%
Principal leadership	63.0	Time	87.0
Collaboration with other department chairs	57.5	Job expectations	26.7
Professional learning	43.8	School culture	19.9
Job expectations	43.2	Principal leadership	19.2
School culture	41.1	Compensation	16.4
Time	22.6	Professional learning	8.9
Compensation	16.4	Collaboration with other department chairs	6.8
Other	8.2	Other	7.5
No selection	4.1	No selection	1.4

Role in instructional decision making. The combination of school contextual factors and an individual chair's social negotiations result in an often fluid role in instructional decision making, which then shapes the chair's practice as an instructional leader. A majority (80%) of chairs reported they had at least some influence on instructional decisions affecting their departments, and 26% reported decisions were made collaboratively. However, 59% of chairs reported that school or district administrators were most influential in these decisions. Open-ended responses indicated that this influence was often gained through participation in a school leadership team made up of department chairs and school administrators. Nearly half (49%) of respondents reported that their current responsibilities were a good fit with their ideal image of the department chair role. The remaining respondents generally preferred a greater emphasis on instructional leadership or a lesser emphasis on managerial duties. For most (84%) chairs, traditional instructional supervision—observation and evaluation of teachers—was not part of their responsibilities. Chairs were more likely to monitor and provide feedback to teachers through non-evaluative processes such as mentoring new teachers (82%), conducting informal classroom observations (75%), reviewing assessment data (71%), peer coaching (53%), and reviewing lesson plans (38%).

Prioritizing and enacting instructional leadership. Chairs, of course, are first classroom teachers, and this responsibility consumes the majority (72%) of their time. Beyond teaching, chairs must balance instructional leadership with the managerial duties that are a universal aspect of the chair

position. Although it is counter to many chairs' preference, respondents reported that they spent a larger percentage of their time on managerial duties (14%) than on instructional leadership (11%). These averages do not reflect the diversity of responses given to an open-ended item regarding how chairs prioritize instructional leadership among their other duties. This prioritizing is represented in a pivotal location in the conceptual model shown below as it represents the nexus of the school context and the chair's professional practice. For some chairs, the lack of administrative expectations and lack of time led them to conclude that instructional leadership was not a part of their responsibilities. These chairs simply carried out the clerical and managerial duties required to keep their department functioning. Other chairs struggled to exercise some influence in the face of severe limitations. One chair noted, "Instructional leadership is critical…, however, it sometimes gets "pushed to the side" with managerial tasks…" Rather then discussing the priority of instructional leadership in response to the item mentioned, most chairs simply described the practices in which they engage as they negotiate the supports and limitations of their school contexts and attempt to serve as instructional leaders for the teachers in their departments. These practices were the primary focus of this study and represent the culmination of the conceptual model presented here. The remaining discussion of findings will focus on the practices that emerged from the analysis of chairs' selected- and open-ended responses to items on prioritizing instructional leadership and effective instructional leadership practices.

Leadership Practices

As mentioned above, the majority of chairs did report having some influence on instructional decision making within their departments, and these chairs employed a wide range of professional practices with the goal of improving science teaching and learning. The eight boxes shown along the right margin of the conceptual model represent leadership capabilities (Robinson, 2010) comprising clusters of practices reported through open-ended responses (see Table 3.4). Leadership capabilities "describe what people need to be able to do and to be, to carry out a particular function" (Robinson, 2010). As a complement to open responses, chairs responded to a set of Likert-type items in which chairs rated the importance of 13 instructional leadership practices gleaned from the literature. Chairs rated

items on a scale from "Not Important" (scored as 1) to "Very Important" (scored as 4). All 13 practices earned mean ratings above 3, but six practices were rated significantly higher than the others (Table 3.6).

Table 3.6

Importance of Instructional Leadership Practices in Influencing Teachers' Instructional Decisions as Rated by High School Science Department Chairs

Instructional Leadership Practice	Percentage of Responses					Mean Score
	Not Selected	Not Important	Slightly Important	Moderately Important	Very Important	
1. Building relational trust	1.4	0.0	0.0	12.3	86.3	3.9*
2. Modeling desired teacher behaviors	2.1	0.0	2.7	17.1	78.1	3.8*
3. Promoting a common instructional vision with high expectations	2.7	1.4	2.1	14.4	79.5	3.8*
4. Serving as bridge between teachers and administration	2.7	0.0	1.4	21.2	74.7	3.8*
5. Promoting alignment with local, state, and national standards	2.7	0.7	1.4	21.9	73.3	3.7*
6. Promoting collaboration in planning, instruction, and assessment	2.1	0.7	4.1	18.5	74.7	3.7*
7. Applying your knowledge of science content and pedagogy	2.1	0.7	5.5	32.9	58.9	3.5
8. Providing direct, positive feedback to teachers	2.1	2.1	6.2	29.5	60.3	3.5
9. Using department meetings and formal and informal departmental communications	2.7	0.0	9.6	39.7	47.9	3.4
10. Promoting effective use of material and human resources	2.7	0.7	8.9	39.0	48.6	3.4
11. Monitoring departmental performance in instruction and student learning	2.7	1.4	16.4	28.8	50.7	3.3
12. Supporting and shielding teachers from non-instructional tasks	2.7	3.4	14.4	34.9	44.5	3.2
13. Solving complex problems	3.4	0.7	17.8	43.8	34.2	3.15

Note. Mean rating for all practices = 3.55.
*Mean ratings for these practices were significantly higher ($p = 0.005$) than mean for all practices as determined by a one-tailed t-test.

Acting as liaison. This capability encompasses chairs' efforts to communicate and to maintain productive relationships with teachers and administrators through formal and informal interactions. Maintaining an "open door" policy with teachers allows them to relieve frustration, to provide input for decisions, and to share ideas and receive feedback in an open and supportive environment. Maintaining relationships with school administrators allows chairs to foster and draw on the most important contextual support for their own instructional leadership. In order to be considered as instructional leadership, this capability must rise above simply serving as a conduit of information between teachers and administrators. Rather, chairs must leverage these relationships for the benefit of instructional improvement. One chair illustrated this by stating, "I need to be able to get this information and determine how it impacts science instruction before I can come up with a plan…" This capability includes the practices of building relational trust (Practice 1, Table 3.7) and serving as a bridge between teachers and administration (Practice 4, Table 3.7).

Focusing on the educational core. This capability, borrowed from Bybee (2010), refers to chairs placing instructional leadership as a top priority and basing departmental decisions on how to best serve student interests in regard to curriculum, instruction, and assessment. This was evident in one chair's response that "things that will directly impact the instruction that goes on in the classroom get first priority." Another chair stated, "All interactions with peers take place with the assumptions that we will make the best decisions possible so that we impact our students and school positively." This capability incorporates chairs' attempts to guide teachers' pedagogical decision making and to advocate for discipline-specific instructional approaches, such as inquiry and laboratory work. This capability also incorporates promoting alignment with standards (Practice 5, Table 3.7).

Maintaining department culture. This refers to the chairs' ability to maintain a supportive, yet demanding departmental culture in which teachers share a common vision for student learning in science. The most commonly cited theme within this capability was supporting teachers, which chairs accomplished by solving problems, providing teachers with the resources needed for quality instruction, and shielding teachers from tasks that might detract from planning and instructional time. This is

exemplified by a chair who stated, “I must show my teachers that I consider them to be the real experts on teaching the subjects they teach. I trust them to use their professional judgment to do the best possible job. I will try to defend them from the demands of administrators who do not understand those principles.” While providing support, chairs promoted departmental expectations mainly by modeling effective practices. As one chair put it, “If I bring an idea to the group I must be attempting the idea in my own classroom.” This capability encompasses promoting a common vision and high expectations (practice 3, Table 3.7) and modeling desired teacher behaviors (practice 2, Table 3.7).

Leading and facilitating collaboration. This capability refers to collaboration primarily at the course team and department levels. Collaboration ranged from simply sharing ideas to planning new lessons based on analysis of student work or assessment data. Chairs' roles in collaborative meetings ranged from participating to facilitating to supervising. This includes the practice of promoting collaboration in planning, instruction, and assessment (Practice 6, Table 3.7). Facilitating collaboration in planning, instruction, and assessment allowed chairs to draw on teacher knowledge and skills as resources to support student learning. One chair noted, “We all work differently so it is beneficial for us to meet frequently and compare best practices.” Collaboration also empowers teachers to make instructional decisions. One chair described collaboration as “listening to the wants and needs of my department to allow them to employ their best practices in instruction. We share and adopt strategies that lead to the best success for our students.”

Sharing leadership. This capability encompasses chairs’ efforts to maintain involvement in schoolwide decision making and to give teachers a voice within the department. Chairs' ability to do this is directly supported by school administrators who include chairs in schoolwide decision making and provide some autonomy in making departmental decisions. One chair reported that the administration's view of the chair “as the curriculum expert” led to decisions that “are reflective of the needs of both the students and teachers in the department.” Chairs who enjoy this administrative support can then transfer the support to their teachers. Chairs reported that involving teachers in decision making allowed teachers to develop “ownership” in those decisions and encouraged teacher leadership within the department.

Leading through managerial duties. Similar to the role of acting as a liaison, managerial duties are part of all chairs' responsibilities. However, this capability only rises to a level that can be considered instructional leadership when a chair enacts these practices with the specific intent of supporting and improving teaching and learning in the science classroom. Common clerical duties include disseminating information, maintaining textbook or equipment inventories, covering classes, and ordering departmental supplies. However, some chairs envision even these basic tasks as serving in support of instructional improvement. Managerial tasks that more directly affect the delivery of instruction are participating in the hiring process, scheduling courses and teaching assignments, and observing and evaluating teachers. The explicit intent to support instruction through managerial tasks was evident in responses such as a chair who focused on "making sure teachers have the items they need to provide the best instruction" and a chair who emphasized "putting the right teachers with the right students and team teachers...in situations that help students be most successful."

Facilitating professional learning. This capability encompasses chairs' work to facilitate professional learning and improvement in a broad sense that includes providing feedback through classroom observations, mentoring teachers, guiding professional learning communities, and delivering or encouraging participation in professional learning activities. While most chairs did not provide rich detail when citing this theme, one chair captured the essence of the theme in the statement that "it is through this self-reflection that we are able to grow as professionals and have the greatest positive impact on our students' learning."

Conclusions and Implications

This study provides several implications for policy, practice, and research in the field of science department chair instructional leadership. First, no one chair constantly enacts all these capabilities. Rather, chairs enact these leadership capabilities in a contextual and interactional manner that responds to the constantly shifting school context. Thus, the practical value of this research lies in providing a point of departure for professional reflection rather than in providing a checklist of leadership activities. At the same time, future research in the area must take into account the interactional and contextual nature of

this leadership. Qualitative methods such as narrative inquiry or case study might provide appropriate means of gaining a richer view of chair's instructional leadership practice. Second, time is an overwhelming limitation on chairs' ability to act as instructional leaders. With few chairs receiving release time for their duties, schools and districts that wish to exploit chairs as a resource for school improvement must consider providing time to accomplish this important goal. Third, this study begs the question of whether administrative support is simply a necessary precondition for effective chair leadership or whether the school principal is really the sole factor in defining instructional leadership within a school. There is conflicting evidence on this question, and the relationship between instructional leadership of the school principal and the chair bears further attention by researchers. Finally, the general nature or chairs' responses on this survey calls into question whether instructional leadership in science is substantively different than such leadership in other subject areas, and this deserves further attention.

CHAPTER 4

NARRATING SCIENCE INSTRUCTIONAL LEADERSHIP: A COMPARATIVE POSITIONING ANALYSIS OF HIGH SCHOOL DEPARTMENT CHAIRS' NARRATIVES OF PROFESSIONAL PRACTICE[2]

[2] Peacock, J.S. To be submitted to *Qualitative Inquiry*.

Abstract

High school science department chairs are under-researched and underutilized as instructional leaders, and existing literature largely focuses on the limitations, e.g., lack of time and role ambiguity, chairs face. However departments represent important sites of professional learning, and chairs represent important connections between high schools and the field of science education. Given proper supports, chairs may represent an important resource in implementing the major curriculum reforms now facing science teachers. A research approach that moves beyond role theory to investigate the complex social interactions that allow chairs to enact instructional leadership is needed to inform research and practice in this area. This article draws on interview data from a study with exemplary science department chairs to demonstrate how narrative positioning analysis can contribute to our understanding of instructional leadership practice. This approach explores how chairs' discursive positioning during research interviews allowed them to generate professional knowledge regarding their leadership practice.

Keywords: narrative analysis, positioning theory, professional practice, instructional leadership, department chairs, science education, high school

Introduction

Implementing the curriculum reforms laid out in *A Framework for K-12 Science* Education (National Research Council, 2012) will require significant shifts in teacher practice within the high school science classroom. As science teachers negotiate this ongoing national standards movement and the ever-shifting context of science education, leadership aimed at maximizing the quality of instruction and student learning is critical. Because high school teachers strongly identify with the academic department (Siskin, 1994), science department chairs represent an important source of such leadership. Science departments represent important contexts for professional learning (Melville & Yaxley, 2009). In addition, chairs represent important connections between the high school department and the field of science education (Melville, Hardy, & Bartley, 2011), and they serve as key implementers of curriculum change (Melville, Bartley, & Weinburgh, 2012). Unfortunately chairs' leadership practice is not well understood, and department chairs are underused as a resource for improving instruction (Weller, 2001).

While researchers regularly argue that high school chairs are in prime position to provide instructional leadership within their departments, research (e.g., Mayers & Zepeda, 2002; Wettersten, 1994; Willis, 2010; Zepeda & Kruskamp, 2007) paints a portrait of the chair as a professional who is asked to do too much in too little time and with too few resources.

Even so, several important themes emerge from the literature and point to the potential for the department chair to act as an instructional leader. First, the literature highlights the key leadership roles department chairs can play within high schools. Department chairs can act as instructional leaders, and this is widely accepted as the primary goal of the position. Department chairs can also facilitate school change that leads to improvements in teaching and student learning. Second, the literature provides some understanding of the contexts in which department chair leadership occurs. This leadership is enacted primarily through social interactions with teachers and administrators and is mediated by school leadership structures, local context, and subject-area differences. Finally, the literature points to directions for future research. Recent studies (Skinner, 2007; Willis, 2010; Zepeda & Kruskamp, 2007; Ritchie, Mackay, & Rigano, 2005) indicate the need to move beyond the strict application of role theory to explore department chair leadership in terms of social interactions. O'Neill (2000) suggested that narrative methods offer an ideal tool to understand and enhance department chairs' work but this suggestion has gone largely unheeded.

Department chairs constantly interact with a range of stakeholders holding incongruous expectations, and the chair's role is constantly negotiated through social interactions with these stakeholders. The literature on department chairs and instructional leadership is littered with long lists of knowledge, skills, and dispositions observed as effective leaders negotiate these social interactions. These lists quickly lose appeal in informing leadership practice or research. As Robinson (2010) noted, a "practical endeavor such as school leadership involves a seamless and dynamic integration of knowledge, skills, and personal qualities" (p. 3) within the complex social environment of a school. Further, Davis (2003) argued that narrative inquiry, by highlighting "contextual particularities and individual agency" (p. vii), provides an important counter vision to the dominant rhetoric in school reform. Rather than drawing

idealized generalizations from large samples of data, narrative studies give educators the opportunity to "think away from" (Davis, 2003, p. viii) particular narratives to imagine how these stories might inform their own context-specific practice. Thus, a narrative approach is appropriate to understand and inform the instructional leadership practice of science department chairs. The goal of this article is to demonstrate how comparative narrative positioning analysis can contribute to our understanding of high school science department chairs' instructional leadership practice. This approach explores how chairs' discursive positioning during research interviews allows them to generate professional knowledge regarding their instructional leadership practice.

Theoretical Perspective: Narrative Positioning Analysis

Role theory, the view that an individual's social behaviors tend to conform to pre-existing roles that are determined by social context, dominated social psychology through much of the twentieth century and continues to influence research on the leadership role of high school department chairs. However, I argue that positioning analysis, as first explicated by Davies, Harré, and van Langenhove (Davies & Harré, 1990; Harré & van Langenhove, 1999; van Langenhove & Harré, 1999) and as applied to narrative interview research by Bamberg (1997, 2003, 2006, 2011), represents a more appropriate and more fruitful approach to understanding the professional practice of high school department chairs and other school leaders. Specifically, analytic attention to positioning within professional narratives can reveal the emergence of professional identities and the production of new knowledge of professional practice.

Development of Narrative Positioning Analysis

Positioning analysis can be traced to Hollway's (1984) analysis of how gender differences arise as men and women take up certain positions within gender discourses. Shortly after Hollway's (1984) chapter was published, Davies and Harré (1990) presented positioning as an alternative to role theory in the social psychological study of identity and selfhood. In contrast to the static view of role theory, positioning theory draws on social constructionism and discursive practice to produce a view of identity as flexible and emerging through the dynamic social episodes of conversations (Davies & Harré, 1990; Harré & van Langenhove, 1999). Davies and Harré (1990) argued that a conversation comprises the

discursive efforts of the participants to define and make meaning of their own and of one another's social actions. In this view, positioning "is the discursive process whereby selves are located in conversations as observably and subjectively coherent participants in jointly produced story lines" (Davies & Harré, 1990, p. 48). Thus individual identities are not fixed entities that enter into conversations or other social interactions; rather, identities are constructed through these interactions.

According to Davies and Harré (1990), participants in a conversation may position themselves or others in the conversation, and participants may make use of culturally familiar subject positions—these are analogous to roles but are more flexible and are mediated by personal experience—or they may employ transient, contextual positions. Participants' identities emerge as they accept, refuse, or modify positions within a social interaction. Rather than focusing on the defining effects that pre-existing roles have on social interactions, positioning analysis focuses "on the way in which the discursive practices constitute the speakers and hearers in certain ways and yet at the same time…" serve as "…a resource through which speakers and hearers can negotiate new positions" (Davies & Harré, 1990, p. 62). Harré and van Langenhove (1999) enhanced our understanding of positioning by defining positions in terms of shifting moral orders that provide speakers with certain rights and responsibilities within the conversation. These moral positions—"powerful or powerless, confident or apologetic, dominant or submissive, definitive or tentative, authorized or unauthorized, and so on" (van Langenhove & Harré, 1999, p. 17)—represent locations within a larger social order and within the local conversation. A deviation from jointly accepted positions requires an individual to account for the deviation before successfully taking up the new position.

Bamberg (1997) combined Davies and Harré's (1990) concept of discursive positioning with a Labovian (Labov & Waletzky, 1967/1997) structural approach to narrative analysis in an attempt to unite structural and pragmatic approaches to narrative inquiry. This approach is built on the joint ideas that narratives represent past events while also revealing what these past events mean to the narrator within a co-constructed social interaction (Bamberg, 1997). Bamberg's (1997, 2003) approach also recognizes that narratives are situated actions with multiple functions within an interactive setting. That is, narratives

produce a certain version of reality through interaction rather than simply revealing underlying identities or realities. Besides linking discursive positioning with structural analysis of narratives, Bamberg (1997) also shifted the focus of positioning analysis from conversations to research interviews. Thus, individuals produce a discursive identity as they narrate and position themselves within a story that is co-constructed with an interviewer or with other participants in a discursive interaction.

Bamberg (1997) formulated three levels of positioning analysis that ask (1) how narrators position characters within the plot of the story, (2) how narrators position themselves with respect to the audience, and (3) how narrators position themselves to themselves. Positioning at the third level allows the narrator to construct an identity that transcends the local interaction to make identity claims in relation to larger cultural discourses (Bamberg, 1997). At the same time that narrators agentively position themselves in relation to story, audience, and discourses, narrators can be subjectively positioned by these larger discourses. Bamberg (2003) argued that positioning analysis provides "an empirically grounded analysis of how subjects construct themselves by analyzing the positions that are actively and agentively taken in their narratives vis-à-vis normative discourses" (p. 153).

Bamberg (2011) refined his approach to positioning analysis to allow researchers to analyze how narrators navigate three dilemmas of identity construction. These consist of navigating between constancy and change, between self and other, and between agent and subject. These negotiations may result in contradictory and shifting positions, and Bamberg's (2011) revised view of positioning focuses on how narrators position themselves within the discursive world while they are also positioned by the discursive world. This approach calls for the analyst to pay special attention to a narrator's moments of negotiation "between different versions of selfhood in local interactional contexts" (p. 16). This finer-grained approach can be applied across the three original levels of positioning analysis.

Applications of Narrative Positioning Analysis

Researchers have applied positioning analysis in a variety of contexts, and the examples discussed below center on narratives of professional practice or professional identity in education. While Baker and Johnson (1998) did not frame their analytic approach as such, their concept of interview talk as

professional practice aligns well with positioning analysis. A goal of in-depth narrative interviews related to professional practice is to lead interviewees to reflect on their prior actions and to create meaning for these actions through a co-constructed narrative. Baker and Johnson (1998) used their analysis of two interviews with a novice high school English teacher to argue that interview talk could move beyond reflection on practice to the generation of new professional knowledge. This perspective is based on a situated view of language in which language is "seen as a resource for describing states and assembling social realities in particular, setting- and listener-relevant ways" (Baker & Johnson, 1998, p. 230). This suggests that "the activities of interviewing be analysed as interactional events in the social world which in themselves provide telling evidence of how people make sense of each other and what resources they use to do this" (Baker & Johnson, 1998, p. 230).

Baker and Johnson (1998) attended to accounting—the process in which the interviewee justified his teaching decisions and actions—as a sense-making technique during and in the analysis of the interview. Drawing directly on Gee (1996), Baker and Johnson (1998) were interested in how the novice teacher discussed his work in terms of a number of discourses of English teaching, but they ultimately viewed the interview talk "as representing and constructing different positions within a discourse of moral responsibility" (p. 230) stemming from the teacher's duty to his students. Baker and Johnson's (1998) attention to accounting "allow[ed] the interview talk…to be understood as 'culture in action'" (p. 231) and therefore as the practice of professional knowledge. Further, Baker and Johnson (1998) proposed that researchers should "treat interview talk as social action in that such talk can reshape practice" (p. 239) with the goal of improving professional practice in education. Although this approach may well be fruitful in interviews with a wide range of teachers and education professionals, the situation of Baker and Johnson's (1998) analysis was particularly conducive to their approach. The original study from which the interview transcript was drawn involved a university supervisor acting as researcher with pre-service teachers who then transitioned to their first year as licensed teachers. The relationship between the researcher and participants and the career stage of the participants provided a context of professional learning that may not be present in other interview situations.

Johnson (2009) directly applied positioning analysis to the study of an Australian principal's construction of a leadership identity through two interview narratives. Johnson (2009) took a multi-layered approach that began by using a Labovian structural approach to identify narrative elements for analysis within a larger interview and to organize characters and actions into a plot. On top of this structural analysis, Johnson (2009) layered Bamberg's (1997, 2003) positioning analysis. According to Johnson (2009), positioning analysis provided an "empirically-grounded" (p. 270) method to analyze "identities persons construct for themselves as they engage in storytelling" (p. 270). In her analysis of the principal's narrative, Johnson (2009) detailed how the principal actively narrated her position and identity, first as a strong manager and later as a pedagogical leader within a distributed leadership model. Johnson's (2009) third layer of analysis drew on conversation analysis "to demonstrate how the storyteller…and the interviewer position each other as particular kinds of identities" (p. 275). Johnson (2009) argued that narrative functions "in not only recollecting the past, but in constituting the future" (p. 271). In Johnson's (2009) example, "the act of storytelling allows the principal to generate extensive knowledge in collaboration with a listener/interviewer about what it means to be a principal who strives to facilitate change under somewhat difficult circumstances" (pp. 271-272). While Johnson's (2009) work effectively demonstrates that narrative positioning analysis provides a useful method to explore the complex nature of school leadership practice, her attention to turn taking is an unnecessary complication. Johnson's (2009) interactional analysis is equivalent to Bamberg's analysis of how narrators position themselves with respect to audience, and her reliance on tools of conversation analysis does not greatly enhance the meaning that would be generated by Bamberg's more general approach.

Watson (2007) drew directly on Bamberg's positioning approach in her analysis of a narrative constructed by two student teachers that served to help these narrators develop their professional identities as teachers. In a well-reasoned theoretical introduction to her study, Watson (2007) presented positioning analysis as an alternative to both the intense focus on interactional turns within conversation analysis and the tendency to impose ideology onto participants in discourse analysis. Watson (2007) argued that the

two student teachers, who were both mature students, used a narrative about a young, inexperienced teacher's struggles with classroom management to make claims about their own professional competence.

As Watson (2007) moved carefully through the three levels of analysis, she highlighted aspects at each level that provide guidance to researchers attempting a similar analytic approach. In the first level, Watson (2007) carefully considered how alternative positions illuminate the meaning and purpose of the positions that were actually given by the narrators. Watson is also careful to consider the positioning of all characters—direct, indirect, and imagined—in the narrative. In her second level analysis, Watson (2007) focused on how the narrators used an other, the inexperienced teacher, to establish their own positions as competent teachers. Here Watson (2007) focused on the "performance of identity" (p. 379) that the narrators accomplished through their interactions with one another and with the audience. Watson's (2007) third level of analysis clearly established a connection from the narrators' positions within the narrative to external discourses of student ability and professional competence. Watson (2007) attempted to reveal the narrators' "agentic positioning of self within a discourse…while at the same time acknowledging that the individual is positioned by the discourse" (p. 383). In sum, Watson's (2007) analysis laid out a clear path from interactive moves within the story about the inexperienced teacher to transferable claims about the narrators' identities as competent teachers. Any research narrative is co-constructed, and any analysis of such a narrative necessarily privileges the researcher's perspective. However, Watson's careful attention to her participants' meanings grounded her analysis and resisted the imposition of the analyst's favored perspective.

Søreide (2006) applied a version of narrative positioning analysis to investigate professional identities among five Norwegian elementary teachers. Søreide's (2006) approach to positioning differs from the previous examples in two important ways. First, her analytic approach stems directly from Davies and Harré's work and is more heavily influenced by discourse analysis than is Bamberg's approach. As a consequence, Søreide (2006) did not give attention to the narrative practices and interactions that are the focus of Bamberg's first two levels of analysis. Instead, Søreide's analysis was closer to Bamberg's third level. Second, Søreide (2006) attempted to make comparisons across the

narratives of multiple research participants, while the previous examples dealt with single participants or single narrative events.

Based on these differences, Søreide's (2006) approach exhibited certain relative strengths and weaknesses. Søreide's (2006) choice to focus on discursive positioning to the exclusion of interactive narrative practice resulted in a heavy focus on the teachers' use of pre-existing subject positions such as "the caring and kind teacher" or "the professional teacher" (p. 536). While Søreide (2006) did discuss how teachers align themselves with or distance themselves from subject positions, her approach had more in common with role theory than is intended by Davies and Harré (1990). Søreide (2006) presented the discourse of teacher identity as if it was simply a coat closet full of subject positions ready to be selected by teachers. In this view, teachers selected the most appropriate subject position from a larger cultural discourse rather than constructing a flexible identity within a local social interaction.

Søreide's (2006) attempts to draw comparisons across participants represented a strength of her approach. While Søreide (2006) was careful to establish that she did not attempt to present a collective identity for all Norwegian teachers, a comparative approach can help researchers understand the multifaceted nature of a professional endeavor such as teaching. However, Søreide's (2006) analytic approach fell short of illuminating the true range of identity work in which teachers might engage. Søreide's (2006) analysis was based on a coding scheme built around a static view of subject positions. As indicated above, the lack of focus on situated narrative practice limits the analysis to what the narratives are about rather than how they function to generate professional identities.

While Davies, Harré, and van Langenhove (Davies & Harré, 1990; Harré & van Langenhove, 1999; van Langenhove & Harré, 1999) conceptualized positioning theory in the context of conversations, Bamberg (1997) successfully argued that this perspective is equally appropriate when analyzing narratives generated through interactive research interviews. Bamberg (2006) further argued that positioning analysis is concerned with how speakers give account for and make meaning of past actions through their narratives. As narrators give these accounts they generate an emergent and flexible identity and knowledge of self. Parallel to this, Baker and Johnson (1998) argued that teachers generate new

professional knowledge as they account for their teaching practice within research interviews. Therefore, by asking science department chairs in my study to generate narratives that give account for their professional practice in relation to instructional leadership my goal was to guide these department chairs to generate emergent professional identities as instructional leaders and to produce new professional knowledge regarding instructional leadership practice. Both the department chair and the interviewer gain access to and use of this new professional knowledge.

Positioning the Science Chair as an Instructional Leader: A Comparative Approach

As discussed above, the question of how science department chairs effectively act as instructional leaders within their departments represents a gap in the science education literature. Building on the research outlined above, I demonstrate below how a comparative approach to narrative positioning analysis can illuminate the "situated complexities" (O'Neill, 2000, p. 13) of high school science department chairs' instructional leadership practice. The following research question guided this investigation: How do exemplary high school science department chairs position themselves as instructional leaders through their narratives of professional practice? Specific goals of this analysis were to illustrate how narrative positioning analysis can: (a) allow researchers to capture both the commonalities and "situated complexities" of chairs' leadership and (b) provide practitioners the opportunity to "think away from" narratives of practice?

Methodological Considerations

Participants and data generation. The study employed purposeful network sampling to identify science department chairs in public high schools in Georgia who had served as chairs a minimum of three years and who had been recommended by supervisors or colleagues as exemplary instructional leaders. I contacted 51 science education professionals (including science education faculty, district science supervisors, board members for the Georgia Science Teachers Association, and a program director for a university science outreach unit), and 13 of these professionals recommended a total of 24 chairs who met the study criteria. Eleven of these chairs agreed to participate in a 45 to 90 minute semi-structured interview that focused on each chair's professional practice as it related to enacting

instructional leadership within the chair's department. Appendix B provides the interview guide used during these interviews. I also participated in the study by having two colleagues conduct a series of three interviews with me. These interviews followed the same interview guide but occurred at dates throughout the study. These self-interviews provided an opportunity to reflect on my own practice and on affordances and limitations of the narrative interview approach. I conducted all interviews between June 2011 and June 2013. Table 4.1 summarizes demographic characteristics of the participants and the schools in which they worked. None of the chairs received additional release time beyond their regular planning period. Pseudonyms are used for all participants, including the author.

Table 4.1

Summary of Demographic Information for Science Department Chairs Included in Study

Department Chair (Pseudonym)	Sex	Age	Years Teaching	Years as Chair	Annual Stipend	School Setting	Teachers in Department	Schools in District
Alice Brown	Female	48	13	10	$1501-2000	Suburban	11	2
Amy Campbell	Female	50	20	8	<$500	Suburban	11	5
Charles Clark	Male	43	21	7	$2001-2500	Suburban	12	2
Elizabeth Dixon	Female	47	12	4	$501-1000	Suburban	9	5
Melanie Dortman	Female	50	12	4	<$500	Rural	8	1
Judy Gordon	Female	40	18	3	$2001-2500	Suburban	16	5
Brad Johnson	Male	45	22	8	$1501-2000	Suburban	13	5
Abigail Logan	Female	37	10	6	$1001-1500	Urban	8	1
Charlotte Marshall	Female	49	19	5	<$500	Rural	8	1
Ryan Powell	Male	58	9	5	$501-1000	Rural	8	3
Michael Sims	Male	36	7	4	$501-1000	Rural	6	3
Kim Smits	Female	46	15	12	$2001-2500	Suburban	12	5

Analytic approach. Drawing on the theoretical framework outlined above, I used a multilayered approach incorporating aspects of narrative structural and positioning analysis to compare instructional leadership practice across the chairs involved in the study. The major components of this analytic approach are presented in Figure 4.1. Before beginning this analysis, I created verbatim transcripts of each interview.

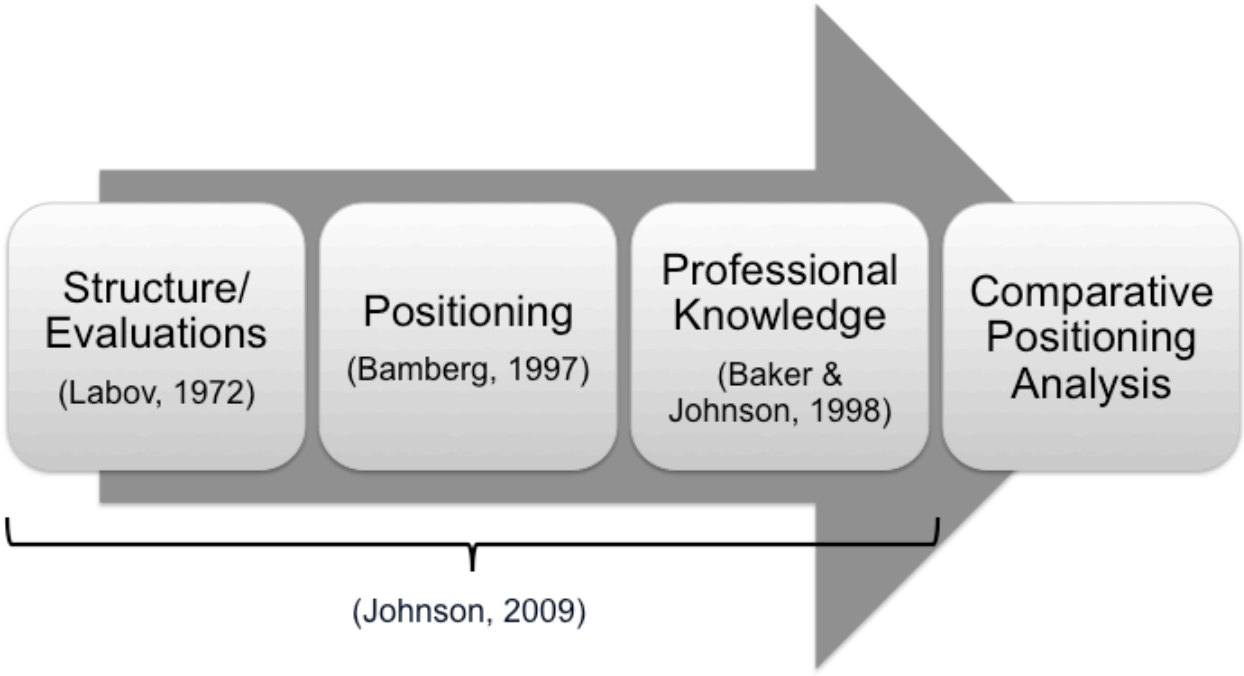

Figure 4.1. Overview of analytic process for comparative positioning analysis.

Structural analysis. After transcribing each interview, I read through the transcript multiple times to identify salient narratives, each of which centered on a particular reportable event (Labov, 1997). Individual narratives were sometimes completely contiguous within the transcript, while at other times participants revisited narratives at multiple points within an interview. After identifying these narratives, I utilized a Labovian (Labov, 1972; Labov & Waletzky, 1967/1997) approach to construct coherent

narratives by identifying and arranging narrative elements (i.e. Labov's abstract, orientation, complicating action, resolution, and coda) into a temporal sequence. In constructing these narratives, I removed my own talk to focus on the meaning generated by the participants. In some cases, I also rearranged and made minor modifications to the participant's talk. Finally, I applied a descriptive label to characterize each narrative element. These labels served as part of the analytic process by identifying the focus of each narrative element. I constructed a total of 135 narratives from the 14 interview transcripts. Sections of transcripts that did not fit into narratives were marked and retained for later analysis.

Below, I provide a sample constructed narrative to illustrate this portion of the analysis. Figure 4.2 presents a constructed narrative about influencing teacher practice from Charles Clark. This example illustrates how structural analysis provided a systematic method to accomplish three important goals. First, the approach allowed me to identify specific narratives by directing my attention to specific stretches of the transcript that centered on a specific topic or example. Often, chairs launched directly into a narrative following one of my questions or probes. However in other cases, one incomplete story might have blended right into another. The Labovian framework aided me in distinguishing between sections of expository talk and specific narratives.

The sample narrative was constructed from a stretch of the interview transcript in which Clark discusses some of the tools at his disposal to influence teachers' classroom practice. Clark began this narrative directly in response to the following probe: "…you mentioned reading and writing and you had tried to, I guess, influence other teachers to incorporate that, so how did you approach that?" Second, the approach allowed me to highlight the content of the narratives (i.e. what is this about?) by focusing on the most reportable event (Labov, 1997) for each narrative. The most reportable event in the sample narrative comes when teachers try new content literacy strategies shared by Clark, only to drop the strategies soon after. The original transcript for this narrative is provided in Appendix C to demonstrate how transcripts were converted into constructed narratives. Appendix D presents a sample constructed narrative from each of the 12 study participants.

Charles Clark
Narrative 8: Influencing Teacher Practice

1. Abstract: Targeting struggling teachers
Well, so, some of the teachers that I know who struggle a little bit with assessment, some of my teachers are really good at that and doing well. I don't necessarily worry about those. So, I'm going to target the ones that I know who are struggling with that.

2. Evaluation: Wielding subtle influence
Now, and so, so you have to be very subtle with it, because I don't, you know I don't have any ability to make anybody do anything. No hire and fire, you know, I can give an NI now and then, but that just pisses them off, you know what I'm saying? That's not, that's not going to accomplish anything. It would be nice if there were three categories on that form. That's what we need, you know, we need, we need an NI, but we also need something else or not needs improvement but we need an NI and U, you know. So, we need an NI that doesn't do anything but also focuses them, I hope, I can do that better, so, so that you can create goals from that. Now, it's just punishment, you know what I'm saying, it's not a very good, well, it's not designed very well, particularly if someone like me is doing the observing, which if they're going to put me, you know what I'm saying, they'll just say, we don't want you anymore, you're giving too many NIs, you know what I'm saying? So, that's kind of ridiculous. That's, that's not very smart. Yeah, it is working against me. So I have to, it's a political thing, you know, I guess. Now I know what it's like to be in a political situation.

3. Orientation: Focusing on content literacy
But, in, in, in that kind of thing, you know, is that I've been trained in the reading across the content area,

4. Complicating action: Sharing strategies
and so, I take some of those strategies and will, you know, now and again, I'll just, hey let me show you this. I was thinking about you, and I'll just show it to them on the board. I'll say, why not try this and see how it works, and then we'll discuss it after they try it, and they'll talk about well, this was the problem. OK, well let's think through that how can we best, and so what I'm dong is trying to, is repair the places that I think need to incorporate that more, you know, and do those kinds of things so that helps. And, they try them,

5. Resolution: Changes not sustained
and then they'll forget about it afterward.

6. Evaluation: Limited influence
So, that's, that's what I'm, and but it's, it's short and it's not much, and I don't have time to do a lot with it, but I do make a point to do it once a month or something like that to a teacher, a couple of teachers. And it's good to introduce it in the CCC meetings, or whatever it's called, I can't remember, there's five acronyms we have for these meetings. It's all the same thing, but I don't know what they really, you know, it's the physical science meetings, so yeah.

7. Coda: Something more that I do
So, that would be something more that I do.

Figure 4.2. Sample narrative on influencing teacher practice from Charles Clark.

Third and most importantly, the structural analysis facilitated a focus on the chairs' evaluations of these narratives. This focus on narrators' evaluations, i.e. the narrative elements in which narrators reveal their attitudes about the narratives (Labov, 1997), allowed me to address the guiding question of this level of analysis: How do chairs make meaning within narratives of professional practice? For Clark's sample narrative, the extended evaluation in narrative element 2 provides critical context for understanding the meaning of this narrative. Taking this context into consideration, the meaning of the narrative is not limited to Clark's frustration that teachers may not adopt practices he shares. Beyond this, Clark expressed his frustration with an evaluation system that did not provide an appropriate mechanism for him to give meaningful feedback and a leadership structure that provided teachers little incentive to act on Clark's feedback.

It is also important to consider the full interview transcript when interpreting the meaning of any one narrative. For example, Clark's comment that "they'll just say, we don't want you anymore" referred to an earlier narrative in the interview in which Clark explained that he had been elected as the department chair. Therefore if he alienated teachers by giving poor evaluations, then they had the option of electing a new chair. Thus, Clark found himself "in a political situation" in which he must balance his desire to guide teachers' instructional practice with his concern that teachers might become frustrated and simply replace him. As this example illustrates, close attention to chairs' evaluations is critical in capturing the nuances of their experience as instructional leaders.

Positioning analysis. After constructing the narratives for each participant, I analyzed each chair's positioning within these narratives following Bamberg (1997, 2011) and incorporating Baker and Johnson's (1998) concept of interview talk as professional practice. I recorded the positioning analysis for each narrative in an analytic memo, and Figure 4.3 provides the positioning memo for Clark's narrative on influencing teacher practice. Each memo consisted of a series of notes I made as I read through each narrative multiple times and answered the following four guiding questions.

(1) How did the chair position characters and events within the narrative?

(2) How did the chair position himself or herself to the interviewer?

(3) How did the chair position himself or herself with respect to cultural discourses?

(4) How did these shifting positions allow the chair to construct particular identities as an instructional leader and to generate knowledge about professional practice?

During this phase of analysis, I reread each narrative multiple times, considering each narrative element on its own and in relation both to the whole narrative and to the entire interview transcript. With each reading, I focused on the successively higher level of analysis indicated by the series of guiding questions. At the same time, I remained particularly alert for moments of negotiation (Bamberg, 2011) in which the interviewees actively generated their situated identities and associated professional knowledge. Thus, my positioning analysis focused on the discursive identities and professional knowledge chairs produced as they narrated and positioned themselves within their stories of instructional leadership.

Clark's positioning during his narrative on influencing teacher practice is typical of the uncertainty and negotiated nature of department chairs' leadership practice as reported in the literature. Compared to other chairs in this study, Clark represented the lower end of a spectrum of administrative support. In Clark's narrative, the teacher evaluation process actually became an important character, and Clark positioned that process as punitive and counterproductive in his influence of teachers' classroom practice. Clark built on this positioning of the evaluation process to characterize his situation as a "political" one in which he attempted to wield influence to help teachers improve their classroom practice without holding any formal authority. The school leadership hierarchy/bureaucracy is certainly a meaningful discourse in public education, and Clark took up a very tenuous position within this hierarchy. Elsewhere in his interview transcript, Clark described his school administration as overworked and burdened by district and state initiatives. In contrast to the other chairs in this study, Clark did not cite his school administration as a support for his leadership. This lack of support resulted in a tentative leadership approach in which Clark had valuable expertise to offer his teachers but the teachers found little incentive to take advantage of his guidance.

Charles Clark
Narrative 8 Positioning Memo: Influencing Teacher Practice

(1) How does the chair position characters and events within narrative?

- Clark positions some teachers as strong in assessment and others as struggling. While Clark begins the narrative with this reference to assessment, he shifts his focus to literacy strategies.
- Clark positions the formal evaluation process as a punitive and ineffective means of influencing teacher practice. Instead, Clark attempts to influence teachers through role modeling and providing suggestions for new instructional strategies. Clark acknowledges that this approach is also imperfect: "they try them, and then they'll forget about it afterward."
- Clark also positions the evaluation and feedback process as "a political position," because he must constantly consider the outcome his leadership approach might have on his level of influence within the department.

(2) How does the chair position him/herself to the interviewer?

- In response to a probe about influencing teacher practice, Clark takes the position of a supervisor in that he identifies teachers who are struggling in specific areas and seeks to target these teachers for improvement.
- However, Clark indicated that he must "be very subtle with it" because he doesn't "have any ability to make anybody do anything." He has no line authority, and in some sense he is working at the leisure of department members in that he was elected to his position. Thus, Clark is taking the uncertain position within the school leadership hierarchy that is familiar to many chairs.
- In discussing his training in reading across the content area, Clark positions himself as holding expertise that can benefit his teachers.
- Clark shares this expertise with targeted teachers. However he takes on a very tentative position here, because teachers are likely to forget the shared strategies after trying them once in the classroom.

(3) How does the chair position him/herself with respect to cultural discourses?

- Clark maintains a tenuous position within the school leadership hierarchy. He attempts to influence teachers' instructional practice, but he must balance these efforts against the risk of alienating the teachers.

(4) How do these shifting positions allow the chair to generate knowledge about professional practice and to construct particular identities as an instructional leader? Highlight and moments of negotiation (Bamberg, 2011) in which the interviewees actively generated their situated identities and associated professional knowledge.

- In this narrative, Clark clarified his understanding of his role as a "political situation" in which he attempts to wield influence without the power that comes from line authority. Clark positions his leadership practice as an attempt to influence targeted teachers in ways other than giving negative observation ratings, which "just pisses them off." Clark negotiates the positions of having what he considers valuable expertise to share with teachers and understanding that teachers have little motivation to take full advantage of this expertise.

Figure 4.3. Positioning memo for Charles Clark's narrative on influencing teacher practice

The methods described here are modeled after Johnson's (2009) study of principal leadership identity with three important distinctions. First, I traded Johnson's focus on conversation analysis for a

greater emphasis on positioning. Second while Johnson's (2009) interest was primarily in identity, the attention given to identity in my analysis is in service of understanding professional practice. Third, I added a comparative analysis that moves beyond a single participant as described in the following section.

Comparative analysis. The constructed narratives and positioning memos, served as data sources for a comparative analysis, in which I sought to highlight both the commonalities and the situated complexities of high school science department chairs' instructional leadership practice. To that end, I compared data across narratives and positioning memos both within and across interview transcripts. I sought to identify commonality and diversity in chair's stories, evaluations of these stories, positioning within the stories, professional identities, and professional practices with respect to science instructional leadership. To accomplish this, I compared across chairs to determine how they enacted instructional leadership within their particular school contexts. I conducted this analysis by reviewing the positioning memos for each chair, while also referring back to the constructed narratives. As I did so, I generated a memo for each chair summarizing the chair's positioning with respect to leadership practice, school context, and discourses. The following question guided this level of analysis: How did chairs use evaluations, discourses, and relative positioning within their narratives to accomplish the positions identified through this analysis? The analytic process culminating with the positioning summary memos provided a systematic means to draw comparisons across the 12 science department chairs involved in this study, and these memos provided the basis for the overviews presented below for each chair.

Constructing Situated Knowledge of Chair's Instructional Leadership Practice

Recall that a goal of this analysis was to capture both the commonalities and the diversity within high school science department chair's professional practice as instructional leaders. Even so, the strength of the narrative approach lies in its ability to capture the context-dependent nature of professional practice. Therefore, findings from this analysis are presented below not as lists of common leadership practice but as portraits of each chair's situated practice. Common themes did emerge across these portraits, and the theme that emerged most strongly was that the ways in which chairs positioned themselves as instructional leaders was shaped by each chair's particular school context. Further, the

most important aspect of the school context appeared to be the chair's positioning within their school's leadership hierarchy. Therefore, the following portraits of each chair's situated practice are organized based on commonalities in chairs' positioning within their school leadership structures. It is not possible to represent the full range of complexity of each chair's practice. Instead, I aim to give a sense of the leadership identity each chair constructed within their narratives and to highlight the diversity in leadership practice found across the 12 chairs included in this study.

Chair as liaison. Acting as a liaison between the teachers in the department and the school administration is a fundamental role for high school department chairs. The most basic enactment of this role simply positions the chair as a conduit of information from the school level to the department level, and perhaps vice versa. All chairs in this study moved beyond this basic communication role to leverage their positioning between teachers and administrators to influence instructional practice in their departments. However, three chairs—Ryan Powell, Brad Johnson, and Alice Brown—did position their instructional leadership primarily in terms of the liaison role. As a result, these chairs negotiated their leadership identity mainly within the context of implementing administrative initiatives.

Ryan Powell: "we wanted to be the best." Powell positioned himself directly as "the liaison between the teachers in the department and the administration" within an administrative framework focused on general instructional initiatives, such as common assessment and differentiated instruction, and on student achievement on standardized tests. While Powell generally positioned his administration as supportive, he did not indicate that he or the department had any input into schoolwide decision making. By the measure of student test scores, Powell's department was successful. Powell established that early in his interview, as demonstrated in this excerpt from Powell's second narrative.

> *2. Abstract: Making gains on state tests*
> With that in mind then, that, I always try to talk to them about what, you know, we represent a school that has gained tremendous gains from the standpoint of state tests, assessments,
> *3. Complicating action: Advising other schools on making gains*
> and which we had other schools calling us, to try and say how are y'all making those kind of gains?
> *4. Evaluation: Caring about students and teaching*
> So, you know, we've made some gains, and I think that has to do with the fact that our

> teachers, science teachers who extremely care about their students, extremely care about what they're teaching, and you know want to do good jobs.
> They are here to do a good job. They are here to teach and to teach well.
> *5. Complicating action: Supporting teachers*
> With that in mind, then I say what can I do as the department chair to help you achieve those goals and stay at that goal or higher and get beyond that.

As the excerpt shows, Powell attributed his department's success to his teachers rather than to his own leadership. While discussing classroom observations in a later narrative Powell positioned himself clearly as a colleague among his other teachers, stating that "some of them are better teachers than I am, you know, and that's great...I might learn from it and see things, or I might see things that I could suggest to them." Powell did position himself as supporting the department's collaboration by coordinating meetings, but he positioned himself simply as an equal collaborator within these interactions. Powell's efforts to support his teachers and to provide more active leadership were severely limited by a lack of time and by competing responsibilities. "They're pulling me to do other things lots of times, you know, on the leadership aspect…my plate's loaded," Powell said referring to a new extracurricular assignment.

Powell attributed the open and cooperative culture within his department to the split from a second district high school several years prior to the interview. "When we were left on our own, we made a pact that it's, whatever we got is open for everybody," Powell said. That split ignited a competitive spirit within the department, according to Powell. Comparing his school to the newly formed high school, Powell said, "we wanted to be the best…we didn't want to lag behind." Thus, the culture and goals within Powell's department were shaped more by administrative priorities and by the particular history of the school and department than by his efforts to shape the culture. Powell did position himself as supporting that culture by maintaining open lines of communication within his department. It is also notable that Powell recognized the importance of instructional leadership specific to science. Regarding his administrators, Powell noted that they were supportive in terms of "common standards or that kind of thing" but were unable to provide "instructional guidance…specific to science." Powell's only answers to filling that gap were sharing information from science education workshops or conferences with his teachers and encouraging the teachers to attend such conferences.

Brad Johnson: "push[ing] the administrator's agenda." Johnson provided an interesting case in that he had conducted graduate research based on department chair leadership context and practice. Consequently, Johnson had gone through an intense period of reflection on his role, and he discussed that early in the interview.

> ***Narrative 2: Department Chair Roles***
> *1. Abstract: Department chair roles*
> Well I'll tell you, from my research, what I really figured out is the main focus of my job is to push the administrators' agenda.
> *2. Complicating action/evaluation: Pushing the administrative agenda*
> You know, they cast the vision, and my job is, I'm kind of a salesman or middleman, kind of thing. It's not, I'm not especially supervisory, you know, but if they say, we're going to focus on blah, blah, blah, then that becomes my role.
> *3. Complicating action: Managerial roles*
> There's other things like budget, I do the budget, and if somebody needs to order something, they come to me, and you know, I'll order the yearly order. I sit in on interviews when they're going to hire teachers. What else? That kind of stuff.
>
> *4. Evaluation: Pushing the administrative agenda*
> But it's, just the broad brush is that I'm pushing their agenda.
> That's what I've decided.
> *5. Resolution: Working without a job description*
> See, mine doesn't even have, I don't even have a job description…that was one of the things that I looked for all over. There is no job description in my county for a department chair.
> *6. Coda: Working without a job description*
> It's just, so, it would be nice to have one. [Laughter]

Thus, Johnson clearly positioned himself as a liaison with the primary responsibility of pushing the administration's agenda. Johnson positioned modeling as his most effective practice in pushing an agenda that included initiatives such as analyzing student assessment data and aligning teachers' grading practices. Interestingly, Johnson actually cast his principal as a middle manager relative to district-level decisions. Therefore, Johnson served as the middleman for the middle manager. In other words, Johnson positioned himself as exerting little influence on instructional decisions in the school with the only exceptions appearing to come within his managerial duties related to hiring, budgeting, and scheduling.

Johnson did position himself as working to support instruction through his managerial duties (i.e. hiring, scheduling, and budgeting). After beginning with a mechanical description of the scheduling process, Johnson came to the realization that "I guess they do kind of depend on me for that kind of stuff"

with the "stuff" being to understand how teachers' strengths and weaknesses impact the scheduling process. As the interview progressed, Johnson continued to characterize himself as possessing specialized knowledge (i.e. content knowledge, knowledge of his teachers' strengths, and knowledge of "how to make teachers happy") that was important in effectively carrying out his managerial duties. Johnson positioned himself most actively within the hiring process, in which his primary concern was identifying candidates that "fit" into the department in terms of qualifications and fitting within the departmental community.

Johnson also positioned himself as providing support and feedback to teachers on a limited basis, and he characterized instructional supervision as a leadership void at the school level ("reality is, nobody's overseeing what's going on in the classrooms"). In a notable narrative on providing feedback to a teacher, Johnson overheard a teacher who miscommunicated a public health statistic to her biology class. Johnson discussed the misstep with the teacher, and he characterized this event as an example of his role as "somebody in the school that…sees the bigger connections." Thus, Johnson served, at least in a limited fashion, a role of promoting a connection between classroom science and real-world science.

Alice Brown: "teachers are professionals, but they're human."

Alice Brown positioned herself as constantly negotiating, somewhat reactively, a space between the school administration and teachers in which to enact instructional leadership. Brown positioned this space as fluctuating from year to year and positioned herself as relying on an "extra push" from the administration to guide her work as an instructional leader. In the following excerpt, Brown recounted her department's response to a renewed administrative focus on common assessment.

> *4. Orientation: Responding to a new administrative push*
> Well, partially we had an administrative change, and he believes in that.
> *5. Evaluation: Sharing ideas and strengths*
> And, my teachers were all very excited about it, because we believe in it too, simply because of the sharing of ideas. I'm not a very creative person; I'm a very analytical person, and I need both those skills to be an effective classroom teacher, so I borrow other people's creativity, and I loan my analytical skills, and so that's why teams work better, basically. I actually happen to love genetics, I hate plants, I could care less about botany, so when I have to do that unit, I work with someone who has a passion for it, so I can at least give that borrowed passion to my students, you know. They've got all they need in genetics, but I just don't have it in botany, so, and when you're assessing test

questions, it takes more than one pair of eyes to really catch everything that's in there, because really even when we have a group of three or four working, when we went back the last time, we're like, oh we all missed this the first time around, so.

6. Evaluation: Getting the extra push

It's just been that the focus hasn't been there, and we haven't gotten that extra push and we now have common time where the teachers are required to work, and so that helps. It's not planning time…It's just a common time, and it's actually afterschool time. It would be nice to have common planning time by subject area at least, but that, I don't know if that will ever happen.

...

9. Complicating action: Facilitating and working as part of the team

Basically, I split the teams up, because you know how it is. There's teachers that teach both life science and physical science. So, we, I developed a working schedule so that you could participate on more than one team but assign you a priority team. So, you got your priority team, but at some point you will get to work with the other team to at least keep up with what's going on and get your input heard. So, I did that portion of it, I assigned team leaders to each of the priority teams. I kind of go from team to team a little bit.

10. Evaluation: Facilitating, not leading

I tend to stay more with the life sciences, because that's where my focus is now, but I'm not the team leader. I am participating as a teacher, and I see my role as kind of to make certain that the teams are on track and that I give them, I've given some instruction as to how to do this, I, because I'm one of the older-both chronologically and professionally-in my department, a lot of my teachers haven't had training in how to write test questions, how to use backward design, and so I have set down with them as a group and gone over some of that. But then when it's time to actually do the process, I only jump in there if I feel like I'm really needed, you know. Like, have you thought about maybe doing it this way or that way? They're much more creative than I am, so I can trust that part of it.

Brown regularly referred to her department as a team, and she positioned her preferred role within that team as a facilitator who focused on exploiting the strengths of her team members. As the narrative above demonstrates, Brown took on a more active leadership role than the previous two chairs, although her leadership was still focused squarely on implementing administrative initiatives that were driven by broad school improvement efforts aimed at raising student scores on standardized tests. As such, Brown did not position her instructional leadership as unique to science education.

Consistent with Brown's use of the team metaphor, she also displayed a greater focus on social interactions than the previous chairs. In a narrative about negotiating with teachers who were resistant to participating in collaboration, Brown positioned teachers ("teachers are professionals, but they're human, and change is hard"), including their experiences and personalities, as directly influencing her ability to

enact instructional leadership. This position highlights the concept of instructional leadership as a social process that depends on interactions among stakeholders.

Informal shared leadership. The following three chairs—Charles Clark, Charlotte Marshall, and Michael Sims—were able to negotiate greater standing within their school leadership hierarchy, although their schools did not have formal systems for shared leadership. As a result of this greater standing within the leadership hierarchy, these chairs were able to move in various degrees beyond the basic liaison role to exert more active influence on instructional practices within their departments.

Charles Clark: "it's a political thing." The sample narrative presented above is representative of Clark's positioning with regard to the leadership hierarchy and to his struggle to enact instructional leadership. Overall, Clark positioned himself as part of a system of checks and balances within the bureaucracy of the education system. Clark acknowledged that the oversight inherent in this system is necessary, but he positioned the bureaucracy as lacking respect for professionalism and as limiting his leadership role within his department. Ultimately, Clark positioned himself as being in a "political situation" in which he attempted to wield influence without the power that comes from formal line authority. Clarke positioned his leadership practice as an attempt to influence targeted teachers in ways other than giving negative observation ratings that alienate teachers. Clark negotiated the positions of having what he considers valuable expertise to share with teachers and understanding that teachers have little motivation to take full advantage of this expertise. Clark discussed the fact that he was elected to the chair position. Therefore if he alienates teachers by being an overbearing leader, then the teachers have the option of electing a new chair. Clark negotiated between rationalizing the current bureaucratic system and imagining the system in which he would have more time to focus on instructional leadership and in which he and his teachers would enjoy greater trust in their professionalism and the autonomy to accomplish specified goals.

In response to a probe about supporting factors, Clark positioned himself as part of a school leadership hierarchy that was overwhelmed with managerial duties and "top-down" district expectations. Clark attempted to position district directives as a support in that they provide a "framework" for his

leadership, but Clark quickly returned to characterizing such directives as barriers to his leadership. Clark provided an example in which district directives prevented the teachers from addressing an important local issue, i.e. chemical storage and safety. Clark stood out from other chairs in the study in that he did not discuss his relationship with the school administration as a factor supporting his instructional leadership efforts. Clark presented his district administration as a hindrance and his assistant principal as overwhelmed by paperwork. Clark hardly discussed his principal. This lack of administrative support likely contributed to Clark's frustration with the level of leadership he is able to enact.

Based on the information presented to this point, it would seem that Clark belonged in the first group of chairs. However, Clark did position himself as seeking an active leadership role within his department. In one narrative, Clark reflected on his efforts to encourage teachers to mentor student research projects for science fair competition. More to the point, Clark also relayed a narrative in which he successfully made changes in the course sequence and course offerings in his department, adding courses at the advanced level and in support of struggling students. Although Clark minimized his level of administrative support and positioned the course changes as an independent action ("I've moved us in the department, doing a couple of things to help us out."), this narrative indicated that Clark is working with his administration to make certain decisions to benefit student learning in his department. This placed Clark with other chairs who participate on some level in school and departmental decision making.

Charlotte Marshall: "what does this look like for us?" Marshall implicitly positioned herself as having been selected to serve as department chair for the purpose of increasing rigor and introducing standards-based instruction into the department.

> *2. <u>Evaluation: Dealing with disconnected administrative expectations and understandings</u>*
> Another way, we sat as a science department, when I came here, there was a lot expected, number one for me to motivate our department into becoming more standards-based, increasing the rigor, our standards,

This colors all her actions as efforts to implement this broad administrative agenda. Beyond this, Marshall referred to a long list of administrative initiatives (i.e. collaborative unit planning, developing common performance tasks, incorporating Common Core-aligned literacy strategies, and action research)

throughout her interview. Understandably, Marshall also positioned time as a limited factor as she tried to balance her various responsibilities. Marshall positioned course team collaboration, modeling, and providing general support to teachers as her main methods to accomplish instructional leadership within these limitations.

Surprisingly, Marshall's narratives also revealed two strategies she used to work within a crowded school improvement framework to target her department's work more specifically toward science education. On one hand, Marshall guided her department in looking at each initiative "to just work together and try to figure out, okay, what does this look like for us." Thus, Marshall explicitly positioned herself in a role of translating general school improvement efforts to tailor them more specifically for the science classroom. On the other hand, Marshall actively advocated with her principal for professional learning targeted specifically at science education for her department. This effort successfully led her department to participate in a laboratory-based workshop, a science education conference, and science-specific school-based professional learning. Marshall also took an active role in other areas, such as revising the course sequence and seeking grant funding. Thus while Marshall experienced a demanding school improvement climate, she negotiated administrative support to serve as an active advocate for science teaching in her department.

Michael Sims: "thinking about the next step." Like Marshall, Sims focused on his attempts to approach a general reform initiative as an opportunity to focus on science teaching and learning. Sims shared a series of narratives dealing with these efforts, and the excerpt below is from the first narrative in that series in which Sims described how a workshop on the Common Core literacy standards for science sparked an initiative to begin implementing recent science education reforms in his department.

> 2. *Abstract: Taking the next step for the department*
> So, the literacy standards got me thinking about the next step that we needed to take,
> 3. *Complicating action: Assessing current practice*
> and at that workshop I made the plan to come back and have a department meeting and just sit down with the teachers and say, you know, look at the standards together and just talk about what are the things we're doing now, what are things that we can, you know, new things we can do and came up with the idea then of doing some kind of coordinated writing tasks,

4. *Evaluation: Setting a common goal for the department*
since that was the focus of the literacy standards, writing and, reading and writing, but the writing I thought was where you could focus on actually, you know, the kids developing a product. So, we would come up with some kind of, you know, coordinated writing tasks for the department and kind of move on from there.
5. *Orientation: Incorporating new science standards*
And, I think that meeting was in the fall and I think we didn't really, didn't really make any moves on that for a while, just with other things going on. So then, in April I went to the NARST [formerly the National Association for Research in Science Teaching] conference, and I had, well, to back up. I think, even before I went to the NARST conference we did have that, let's see. In the meantime, the framework for the new science standards came out and the science practices and descriptions of those came out,
6. *Complicating action: Addressing both literacy and science standards*
and so we did have a department meeting where we looked at both the, both the literacy standards and the science practices and did what I said earlier, just had the department members say, you know what are things that we do now that align to these things and what are new things that we can do,
7. *Evaluation: Setting a clear path for the department*
and so I tried to run that, you know, the meeting it was, I mean I had a clear plan of what we were going to do, but, you know, I tried to just, set up that topic and then let people, the people in the department give input and,
8. *Complicating action: Acting on departmental suggestion*
and one of them actually came up with pretty much the same idea that I had before about doing coordinated writing tasks, but they, they, suggested it in terms of doing a lab report.

Additional narratives described how Sims used understandings gained from attending a science education research conference, meeting with a local university professor and with his district science coordinator, studying the new *Framework for K-12 Science Education* (NRC, 2012), and reading science education research to mold the original idea of implementing coordinated laboratory reports into an initiative to implement scientific argumentation-based lessons into all classes in our department. Throughout these narratives, Sims positioned himself as a change agent, facilitator, and professional learning provider, and Sims was obviously taking advantage of his connections to the science education research community to connect his department to science education reforms. These narratives culminated with two professional learning and planning workshops that Sims organized and led for the teachers and then with the attempt to implement the initiative in the 2012-2013 school year.

While Sims positioned himself in a very active role in this process, such an effort within a school is not possible without administrative support. Sims' narratives positioned his school administration as providing significant support for this and other efforts, but Sims classified that support as informal. Sims'

school did not have the highly structured school leadership systems experienced by the chairs in the next group. Rather, Sims' access to school-level decision making and resources came through less structured interactions with his assistant principals and principal. This leadership climate had at least two important effects on Sims' leadership. On one hand, this climate allowed Sims the flexibility to pursue an initiative that would meet the school goal of addressing literacy standards while also addressing the need of science teachers to align instruction to current, research-based approaches. On the other hand, the administration had little stake in the argumentation initiative. Therefore, the successful implementation of the initiative fell to Sims as the chair, and that is an area in which Sims struggled. As he began to reflect within the interview, Sims came to acknowledge that successful long-term change will require teachers to buy into this new approach as a valuable way to teach science. Sims indicated that he was still negotiating how to best support that change in his role as chair.

Formal shared leadership. The following three chairs—Judy Gordon, Kim Smits, and Elizabeth Dixon—each worked in schools that had established some form of leadership team as a formal structure for shared leadership within the school. Within this framework, each of these chairs worked to distribute that shared leadership to the teachers in their departments. Along with these similarities, the narratives from these chairs exhibited important diversity resulting from differences in backgrounds of the chairs and the teachers in their departments.

Judy Gordon: "I need to lead by example." Gordon positioned herself within a formal school structure, the leadership team, that allowed chairs to participate in schoolwide decision making and that provided a model for goal-directed, collaborative leadership. Gordon enacted a similar leadership approach within her department by collaborating with teachers in setting departmental goals within the schoolwide framework and by delegating responsibilities based on teachers' strengths or special skills. While Gordon certainly worked to implement the administrative focus on initiatives like content area literacy and analysis of student assessment data, she also leveraged her liaison role to serve as an advocate for the teachers in her department. In the following excerpt, Gordon protected her teachers from the additional workload of mandated student participation in science fair.

3. Orientation: Supporting science fair
We don't require our students to do science fair…
4. Abstract: Advocating to manage teachers' workload
…but, you know, every year, we get, why don't we do science fair, why don't we require our kids to do science fair,
5. Complicating action: Negotiating with administration on behalf of teachers
and I finally was talking to my administrator one day…I said, and then, look at the load these teachers already have, I said, we'll do science fair if you agree to take something off their plates, you know, if I ask them to take on this extra responsibility, then what are we going to take off their plate,
6. Evaluation: Benefitting from personal relationship with administrator
and she just kind of, and I'm fortunate that we have a relationship that we can, you know, talk like that and we can agree to disagree and be happy to agree when we do agree,
7. Complicating action: Gaining administrative understanding of teacher workload
and she just looked at me and said I never thought about it like that.…I said, I'm not trying to be ugly, but if we can figure out a way to make their lives easier and to do the science fair, then I'm all in, I said, I don't think it's fair to ask them to do more when we're being consistently given less,
8. Resolution: Negotiating with administration on behalf of teachers
and she's not asked me to do it since [laughter], and she, but she'll use that example often,

Within this and other narratives, Gordon positioned herself as a gatekeeper for the department, working to protect teachers' time for their core instructional responsibilities. In a different narrative, Gordon fulfilled that role by volunteering to attend a series of literacy workshops rather than sending one of her teachers. In contrast, Gordon made sure to include teachers in processes, such as data analysis for a course they were teaching, that were central to their instructional responsibilities.

The science fair narrative also positioned two aspects of Gordon's background as critical to her leadership practice. First, as Gordon noted in the evaluation above (narrative element 6) she shared a positive personal relationship with her administrator. Elsewhere, Gordon described herself and the administrator as "friends and colleagues." In the coda of the science fair narrative, Gordon attributed her confidence in speaking up for her department to her completion of a doctoral degree in teacher leadership.

Although Gordon was highly motivated to be an active instructional leader for her department, she positioned time as a major limitation. In a narrative about instituting common department planning periods in the coming year, Gordon stated that instructional leadership was "a personal goal for me, but it always gets put on the back burner behind…, because, you know, you're crunched for time." Gordon also recognized that even within an environment of shared leadership her own authority was limited. In a

narrative about hiring, Gordon positioned herself relative to the discourse of line authority: "you don't really have that kind of power; "you can make suggestions, but...at the end of the day, it's really the" administrators "who really and truly make the call."

Within these limitations, Gordon sought to maintain teacher buy-in and departmental morale by sharing responsibility and serving as a model for other teachers, as shown in this excerpt from a brief narrative about her teaching schedule.

> *1. Abstract: Leading by example*
> Honestly, I feel like instructional leadership is the most important role, really, for, my motto is, I don't ask the teachers who teach with me to do anything that I wouldn't do,
> *2. Orientation: Teaching honors and special education*
> and that includes teaching honors-level kids as well as special education kids.
> *3. Complicating action/Resolution: Teaching honors and co-taught classes*
> This particular year, I'm going to have honors chemistry then co-taught physical science,
> *4. Evaluation: Leading by example*
> so I've got two extremes on the spectrum, but, I mean, I feel like, that's, that's what everybody has, and so, I feel like I need to lead by example, and so, if I want, you know, if I expect my teachers to use inquiry-based methods, then I need to use inquiry-based methods. If I want them to be dynamic lecturers, then I need to, kind of, be that role.

Gordon felt this approach gave "everybody ownership in the department and ownership in all students succeeding." This narrative also represents Gordon's lone mention of providing leadership that was specific to science, i.e. modeling inquiry-based teaching.

Kim Smits: "there's a constant…give or take." Smits described her efforts to influence teachers as "a constant…give or take," and this idea of ongoing negotiation also described Smits' place in the leadership hierarchy. Smits, very similar to Gordon, participated in a schoolwide leadership team that maintained a heavy focus on analyzing student assessment data while providing a forum for department chairs, along with a second departmental representative, to provide input into schoolwide decisions. Smits described her school as a "team working together to reach common goals." Despite some similarities to Gordon, Smits was able to take on a more active leadership role within her department. Perhaps, this was because Smits felt less restricted by time. Although Smits called her attempt to balance various responsibilities "a juggling act," she did not position time as the severe limitation that it was for

Gordon. One way Smits overcame the time limitation was working before and after her regular school hours to handle clerical tasks that were "not accomplishing the goal of better instruction for students."

Within school hours, Smits positioned herself as an active leader who respected her teachers' expertise while also helping them develop new skills. Smits demonstrated this in a pair of narratives about data analysis within course teams. In the first of these narratives, Smits discussed her efforts to coach teachers in response to a schoolwide focus on analyzing and responding to student assessment data.

> *3.* *Orientation: Lack of understanding of meaningful data*
> Well, initially, a lot of the teachers, it wasn't really clear the type of data that was really useful and was good data,
> *4.* *Complicating action: Educating teachers on meaningful data*
> and so there was a lot of work, I would say almost halfway through the year about, you know, I want to see more than you telling me that three kids got an A on their test, you know, and five kids got a B, really making them connect our standards to the assessment piece,
> *5.* *Evaluation: Working as part of the leadership team*
> and, and I'm not saying it was just me, it was the whole group, team effort to really start pulling apart, well what's good data, and how is that helping,
> *6.* *Complicating action: Using data to make instructional decisions*
> so if we look at it, we've got to do something more than just gather this data and make a graph. It's really more important, what do you do after you look at it and take it apart, now how is that going to guide your instruction.
> *7.* *Resolution: Using data to improve instruction*
> So then we had to get into conversations about, you know, alright here's what we're seeing, now what changes within biology or physical science are we going to do to facilitate, you know, improvement,

Smits highlighted the "team effort" that went into understanding the data initiative, but she clearly positioned herself in a guiding role. Later in that narrative, Smits also laid out goals for further improvement in the following year. In the follow-up to the narrative above, Smits shifted her focus to positioning the teachers as content experts and herself as a facilitator.

> "I don't dictate what they're doing…they're the experts, and so their job is to kind of communicate to me what they're doing, so I can bring that back. It really doesn't do me any good to get in there and tell them, this is what you're doing. I'd rather get in there and help them become excited about something and get them, kind of, moving in a direction…"

In the remainder of that narrative, Smits characterized her role as one of coordinating the alignment between her department and the goals laid out by the school leadership team while drawing on the strengths of the teachers in her department.

Another similarity Smits shared with Gordon was the fact that she attributed her success as an instructional leader to a graduate leadership program. Gordon completed a district-sponsored endorsement program in educational leadership with a cohort of her district colleagues. Even though Gordon had managed a research laboratory before becoming a teacher, she valued the leadership program because it helped her understand the unique aspects of a school district bureaucracy. Finally while Smits did portray herself as an active and supportive leader, her narratives did not provide much indication of a specific focus on science education within her approach. A brief mention of her school's STEM program provided the only evidence that Smits' thinking about instructional leadership was linked to her thinking about teaching science as a unique endeavor.

Elizabeth Dixon: "leading a department of leaders." Dixon's context was similar to Gordon's and Smits' in the presence of a school leadership team that provided input into schoolwide decision making. Related to leadership team meetings, Dixon explained, "we discuss different strategies schoolwide, so that we can figure out, you know, what's going to be best for everybody, and…it's a very, very collaborative effort." Dixon's context was also similar to Gordon's in that these schoolwide strategies focused on general instructional initiatives, such as common assessment, analysis of student data, and differentiated instruction.

Dixon's context was unique, though, in the makeup of her department. Dixon's school had opened only two years before our interview, and she had transferred from her position as department chair at her previous school. As it happened, many of the other teachers who transferred into the department had previously served as department chairs or as lead teachers at the middle school level. Thus, Dixon found herself "leading a department of leaders," and she positioned this as a formidable task. Gaining trust and buy-in from a group of teachers who were used to "pretty much being in charge" required "a lot of listening," and it required Dixon to take a collegial leadership approach that drew on the experience and expertise of all department members. Dixon explained how she accomplished this within department meetings in the narrative below.

Narrative 10: Including Teachers in Decision Making

1. Abstract/Orientation: Giving teachers a voice through department meetings

You mean like just the flow of a regular meeting?

2. Complicating action: Implementing district instructional initiative

Well, you know, whatever topics that I have to address, you know, I'll bring them up one by one, then, you know, and I'll say, okay, this is, this is the goal, this is what's coming from the county, you know, how do we want to handle this, and you know, I just basically sit down. I, I don't even, the teachers just, I mean, they discuss it, you know, and we keep minutes of it, but it's a very collaborative, very lively sometimes discussion, but it's always on topic, and they have great ideas. So, I try to talk as little as possible and ask questions when, you know, especially when somebody brings up a point that really needs some more, you know, we need to delve into a little bit, I ask, I ask a lot of questions. Well, a lot of times I'll have to bring it to closure, you know, I'll, I'll have to summarize and say, okay, we've heard this, this, this, and this, what do you guys think, I mean, we need to come up with a decision here, so let's make one now. And so, I'll have a couple people propose a decision, there may be a little bit more discussion,

3. Resolution: Coming to closure

but then we'll just either agree to it or sometimes we table it because we need to think about it a little bit more,

4. Evaluation: Collaborative environment

but it's, it's very collaborative, and everybody, and most of the time when we, when it's a big deal, everybody's in agreement. You know, there may be one person that doesn't like the total outcome, and they'll say why, but then they'll say, usually, well, I agree with this, and I'm willing to do this or I think we need to do this, however, and then they'll list their caveat, you know, but they still feel like they've had a part of that decision, and, and they do it.

5. Coda: Implementing shared decisions

I mean, they, whatever we decide, it's always implemented, I mean, they always do it, so.

Along with this shared decision making in department meetings, responsibility is also distributed to "common core teams" that focus on "analyzing the data from those common assessments and seeing how they're going to differentiate for their kids that are not getting it." Dixon positioned herself as a facilitator and participant ("I kind of give them feedback and say this is what's worked for us in the past or I've seen this done before, and we just really do it together.") for the common core teams within the physical science courses, while an administrator serves the same role for the biology team. While this work clearly involves expertise in teaching science as a specific discipline, Dixon did not position herself as a leader in that regard.

Chair as autonomous leader. Although the previous three chairs represented their departments within systems of shared leadership, their primary role was to facilitate the implementation of schoolwide improvement efforts within the science department. In contrast, the following chairs—Abigail Logan,

Melanie Dortman, and Amy Campbell—enjoyed various levels of autonomy to make instructional decisions within their departments. Each of these three chairs exercised this autonomy in unique ways. For the first two chairs, it may be a reasonable conclusion that their freedom is associated with working in the only high school in their respective districts. However, Campbell serves in one of five high schools in her district.

Abigail Logan: "making instructionally sound choices." Logan represents somewhat of a hybrid case as she worked within a strong administrative climate, but she also enjoyed some autonomy to make decisions at the departmental level. Logan's context was also unique among study participants in that she served with a co-chair, Dana. Logan characterized the fact that she had a co-chair as a major benefit in that it reduced the time requirements of her duties as a chair and that it allowed each of the women to contribute particular strengths to the role. Logan, for example, positioned herself as the behind-the-scenes leader, handling the budget and providing a sounding board for teachers. Logan positioned her budgeting role as a matter of "making instructionally sound choices," and this reflected her overall practice as a leader. Part of Logan's role, like other chairs in the study, was to implement administrative initiatives, including standards-based grading, common assessment, and the International Baccalaureate (IB) program. However, Logan and her co-chair had the ability to influence how these initiatives were implemented within the science department to make independent instructional decisions within the department.

In the case of the IB program, Logan and Dana successfully lobbied to open the IB biology course to all students in the school instead of only students who would graduate with an IB diploma. Logan positioned this as a move "to make IB as inclusive as possible" and to expose all students to the IB curriculum in some way. Logan praised the openness of her administration but concluded that the move "wouldn't have happened…if we hadn't been on the team, because we really pushed for it." In the case of revising the school's science course sequence, the co-chairs acted more independently albeit with administrative support.

Narrative 6: Participating in Decision Making – Revising the Course Sequence

1. Abstract: Revising the Course Sequence

Five years ago when we went to the physics-chemistry-biology curriculum

2. Orientation: Kids were coming in bored

it was because Dana and I really wanted something different, but at the time the eighth-grade curriculum was physical science, so it was physical science-physical science, and those kids were coming in bored, and we were like, this is crazy.

3. Complicating action: Developing a plan

So, we really researched it, and we went to the administrative team, and they were like, if that's what you really want to do, put together a presentation, put it against the board,

4. Resolution: Presenting the plan

and we did

5. Evaluation: Fully supported

but they fully supported us,

6. Coda: Making an instructional decision

and that was an instructional decision that we were able to make because of it.

Throughout her interview, Logan positioned Dana and herself as the source of these departmental innovations. Logan addressed this directly within another narrative on departmental decisions, stating that "Dana and I have started talking about it first, we take it to our department, see if they agree or not, and then from there we take it to the administrative team, so." In cases when all teachers do not agree, Logan indicated that she and Dana worked to convince the teachers or adjusted the approach to satisfy teachers' concerns.

Complementary to this active approach in guiding the department, Logan positioned herself as a supportive leader who strongly valued the personal relationships that developed as a result of her department's small size and regular interactions during their common lunch period. When discussing providing direct feedback and support to teachers, Logan said "I try to put myself in their shoes and what their strengths and weaknesses are before I give them a suggestion." Logan developed this approach as she reflected on her practice early in her leadership tenure. Similar to other chairs, Logan discussed her work within a course team. However, she did not explicitly position this work in relation to instructional approaches specific to science education.

Melanie Dortman: "Nobody gets in our way much." Melanie Dortman primarily positioned herself as a facilitator who worked to support teacher initiatives and shield teachers from the school bureaucracy. Dortman positioned her administration as being very supportive of the teachers' autonomy

("nobody gets in our way much") with the exception of one assistant principal who failed to follow through on a teacher-initiated plan to provide time for project-based learning. Dortman positioned teachers as active participants and resources in departmental decision making. Dortman positioned herself as an active facilitator ("I'll discuss them from my perspective and then open it up for them.") and as a caretaker who gave positive reinforcement and sought to protect her teachers. As demonstrated in the following excerpt, Dortman's role as a facilitator extended beyond running department meetings to facilitating teachers' efforts to implement new ideas by shielding teachers from "the bureaucratic stuff."

> ***Narrative 4: Supporting a Teacher Initiative***
> *1. Orientation: Facilitating department meetings*
> Well, basically, I'll start off with an agenda, and I'll just put the agenda on the board, things that I know we need to address school-wise and departmental-wise. I'll discuss them from my perspective and then open it up for them,
> *2. Evaluation: Reinforcing teacher creativity*
> and they are very vocal and will carry it forward [laughter] for an hour [laughter]. So, I guess I give them a lot of positive reinforcement, you know, which is I think real important. But, I give them a lot of control, too, just allow them to, you know,
> *3. Orientation: Supporting biology project-based learning initiative*
> like I said with John, he wanted to do this project-based learning,
> *4. Complicating action: Supporting biology project-based learning initiative*
> and I said yeah let's go for it, you know, how can I help you and how can I cut some, some of the bureaucratic stuff out, so that it makes it easier for you to do that.
> *5. Evaluation: Lucky to be treated as professionals*
> We're just lucky we work in a school system where they really value us as professionals and nobody really gets in our way much, so we're, we've been very fortunate. Now, I think that financially things are going to change a lot, and so I think we'll feel a little bit more of a, little bit more of a over…oversight from the board office an what not. But, pretty much, I think that most of my department is so sharp that I just want to make sure that they can grow and that they're happy. They need to not feel like they are stifled at all. I want them to be creative, and I let them know that, just creativity is real important.

Thus Dortman was not directly setting a vision for the department, but she was facilitating the implementation of the teachers' vision for the department. She did indirectly help to set the vision through her leadership activities within the physical sciences. Dortman positioned the school bureaucracy as working against teacher creativity, and she presented her role as shielding teachers from that bureaucracy in order to protect their creativity and autonomy. However, the example of the unsupportive assistant principal illustrates that Dortman's leadership, as with other chairs, is ultimately dependent on administrative support.

Amy Campbell: "It's my department." While chairs in this study experienced various levels of administrative support, Campbell was unique in that her administration deferred so much authority to her that she was a de facto supervisor for her department. The following is an excerpt from Amy Campbell's narrative on dealing with a teacher who went to the administration to challenge Campbell's decision to assign the teacher to teach a particular class. The narrative represented here came in response to my probe: "…when you had to go to that teacher and say this is a requirement, were you able to do that just, kind of, on you own authority or is that in consultation with an administrator, how did that work?"

> *3. Complicating action: She's in charge*
> If, like with this one, she wanted to kind of go over my head with scheduling and all this,
> *4. Resolution: She's in charge*
> he finally just laid it down and said, hey, Amy's the department head, she's in charge, do what she says or find another place to work.
> *5. Evaluation: In a good position*
> So, I'm in a real good position.

Considered within the full narrative and alongside Campbell's other narratives, though, this evaluation paints a clear picture of Campbell's place within her school's leadership structure. This conclusion is also supported by Campbell's positioning of teachers in her department as employees rather than colleagues. Campbell is not simply the liaison between her department and school administrators; she is the de facto supervisor of departmental teachers. This position is a stark contrast to chairs in the existing literature and in this study.

Overall, Campbell positioned herself as a directive leader who knows "how to get things done." Throughout six narratives touching on her negotiations of the leadership hierarchy, Campbell consistently positioned herself as a supervisor ("it's my department, I run it") and characterized the teachers as her employees rather than as colleagues. This positioning is supported within her narratives by her reports that her school administrators have deferred a considerable amount of authority to Campbell. In Campbell's narrative about dealing with teacher issues, she relayed that her assistant principal presented an ultimatum ("do what she says or find another place to work") to a teacher who disputed Campbell's scheduling decision.

Campbell's directive leadership style and lack of emphasis on social interactions with her teachers set her narratives apart from the other chairs who exhibited more tenuous collaborative approaches. Even in narratives focused on co-planning, Campbell positioned herself as separate from other teachers and as directing the collaborative effort. Campbell constructed an identity as a directive leader set apart from her colleagues by her expertise. Campbell's leadership practice appeared to focus on presenting the right way to do things and then monitoring teachers' compliance with that approach. Campbell's positioning with regard to the school leadership hierarchy also contrasted with the other chairs. In her narrative about the school leadership team, Campbell positioned herself as an integral part of a leadership hierarchy. She derives authority from the principal and wields that authority with her teachers. In her narrative on encouraging co-planning and differentiation, Campbell took a more collaborative position in relation to her teachers. At the same time, though, she reinforced the theme of administrative support by stating that "the key to how strong the department head is, is how much support your department head has from the administrative team." As mentioned above, Clark and Campbell set the ends of a spectrum of administrative support on which the remaining chairs in this study fall in intermediate positions.

Discussion: Positioning Chairs' Leadership Practice Within the School Context

Comparative analysis of the ways in which the high school science department chairs in this study positioned themselves within their narratives of instructional leadership practice revealed both the commonalities and the "situated complexities" (O'Neill, 2000) existent in this practice. While each chair's context and practice was unique, this analysis supports the following four conceptual propositions regarding the practice of science instructional leadership by the chairs in this study.

First, chairs' narratives of instructional leadership practice provided stories of social negotiation and role ambiguity. Existing literature and data from this study indicate that chairs' leadership is limited by time, lack of formal authority, and role conflict and ambiguity. The present analysis indicated that this role conflict and ambiguity result from the fact that chairs largely operate parallel to the formal school leadership hierarchy. Chairs' ability to influence the teaching and learning within their department was contingent upon their ability to negotiate standing within the leadership hierarchy, and chairs negotiated

this standing through ongoing social interactions with administrators, teachers, and other stakeholders. In contrast to the static view of chairs' practice presented by role theory, the social interactionist view of chairs' practice reveal that their leadership emerges in a fluid manner through social interactions. The narratives presented here not only corroborate the findings of earlier literature but also expand our understanding of chairs' practice by highlighting the social nature of chairs' efforts to negotiate the role ambiguity that is so prevalent among them.

Second, chairs' practice was shaped by the leadership context of the school, including each school's relative focus on general school improvement efforts, the level of administrative support the chair experienced, and the chair's positioning within the school leadership hierarchy. Chairs generally positioned their leadership within discourses of assessment, accountability, and general school improvement measures and not within the discourse of science education. For most chairs in the study, their administration's focus on school improvement precluded or overshadowed any specific focus on leadership aimed at specific approaches to curriculum, instruction, or assessment within science education. This has serious implications for curriculum and instructional reform efforts aimed at improving science teaching in high school classrooms.

The issues of administrative support and a chair's ability to negotiate standing within the school leadership hierarchy are intertwined. Chairs negotiated standing within their school leadership hierarchy through informal interactions with their administrators, through formal systems for shared leadership, or through a combination of these factors. Chairs who experienced low levels of administrative support and who were unable to negotiate standing in the hierarchy generally were unable to extend their leadership practice beyond their role as a liaison implementing administrative initiatives. Other chairs who gained positioning within the hierarchy through formal structures or informal interactions were able to expand their practice to areas such as guiding professional learning, serving as advocates for the departments, and even initiate or facilitate changes within their departments. Thus, there seems to be a relationship between the level of empowerment a chair experiences and the level of influence the chair can have on the instructional practice within the department.

Third, chairs' practice was shaped by the particular context and history of the school, department, and chair. Chairs in this study employed different leadership approaches based on the unique makeup of their department. Chairs altered their leadership practice to respond the differing needs of experienced teachers, novice teachers, teachers resistant to change, and teachers who saw themselves as leaders. Chairs' leadership practice was also shaped by some departments' particular histories, whether a newly formed school, a department left behind by a school split, or a department experiencing teacher turnover. Each chair's personal and professional history, particularly for chairs who had experienced some form of leadership training, was also important.

Fourth, chairs enacted a range of integrated and interdependent leadership capabilities as they constantly negotiate the social space between teachers and administrators. As they generally work without formal authority, chairs must rely on ongoing social negotiations with administrators and teachers to enact leadership that influences teachers' instructional practice. Chairs attempt to wield this influence while respecting teacher professionalism and while working within a bureaucratic system that can stifle creativity and limit department-based problem solving.

Reflections on the self as a participant. My decision to act as a participant in this study has important implications. As a practicing department chair, participation in the series of interviews, transcription of those interviews, detailed analysis, and then comparison of my own practice to other chairs as outlined in this article provided a unique opportunity for systematic and rigorous reflection on my own instructional leadership practice. Listening to myself and reading my words time and again has forced me to recognize limitations in my practice and to better understand how my practice is shaped by my own school context. I hope to use this knowledge to improve my practice.

Analytically, this self-analysis has been equally valuable in pointing to some important limitations of my narrative interview approach. While analysis of single interview may be able to capture the essence of a chair's approach to instructional leadership, it cannot provide a comprehensive description of that practice. Even after a series of three interviews, I felt compelled to capture an additional example of my practice through direct transcription. This effort resulted in a set of three

related narratives in addition to those recorded during my interviews. Other chairs in the study may have similar experiences of remembering other examples they might have discussed in their interviews. I know from experience that my own narratives do not encapsulate my full range of leadership practices; therefore, I must recognize that the same holds true for the other chairs in the study. I am convinced that the narratives constructed in this study give a reasonable picture of the each chair's overall leadership approach, with the caveat that the interview setting and questions likely led chairs to focus on themselves more than they do in everyday practice.

Concluding Comments

Methodological Conclusions

The present analysis demonstrates the value of a comparative approach to narrative positioning analysis in understanding the situated and interactional nature of department chairs' efforts to improve teaching and learning within high school science classrooms. This value is based on four methodological findings of this study.

First, narrative interviews prompted chairs to generate useful professional knowledge regarding their leadership practices. Drawing on Baker and Johnson's (1998) concept of interview talk as professional practice, I approached each interview with the goal of asking chairs to account for how they were able to navigate the supporting and limiting factors within their school setting to exert a positive influence on the quality of instruction within their departments. This approach allowed chairs to extend their practice through reflection and meaning making and to generate knowledge that was useful to me as a researcher and to the chairs as practitioners. In several instances, participants made statements similar to Brad Johnson when discussing his role in course scheduling: "now that I think about…you know, I guess they do kind of depend on me for that kind of stuff…" This quote indicated that Johnson came to realize in the midst of the narrative that his role in the scheduling process did indeed rise beyond a clerical function to the level of instructional leadership as he applied his specialized knowledge to match teachers and courses in a way that supports instruction. Thus the interviews provide a rich source for improving

our understanding of how these leaders accomplish a critical role within an environment that often presents more obstacles than supports.

Second, the Labovian (Labov, 1972, 1997; Labov & Waletzky, 1967/1997) structural analysis applied to the narratives in this study provided a systematic means to foreground participants' evaluations of their narratives. In the simplest terms, narrative evaluations answer the question, so what? More importantly though, evaluations reveal the narrator's attitudes toward the characters and events within the narrative, allow narrators to assign meaning to narratives, and reveal the narrator's moral theory of the world in which a narrative takes place. Thus, a chair's evaluations during a narrative about a new teacher may reveal the meaning of that particular example as well as the chair's attitude toward induction, mentoring, school bureaucracy, or other important topics.

Third, positioning analysis (Bamberg, 1997, 2003, 2006, 2011) captured the situated and interactive nature of chairs' instructional leadership practice. Schools are complex social environments influenced by state and local education policy, administrative leadership, teachers' experience and personalities, and budgetary concerns, not to mention curriculum, instruction, and assessment concerns. Positioning analysis provided an analytical lens that simultaneously addressed the interplay among department chairs, teachers, administrators, students, educational stakeholders, and social discourses through which chairs must enact their leadership. The complex and contextual nature of this leadership practice cannot be captured adequately through quantitative or thematic analyses. The approach also acknowledges and takes advantage of the co-constructed nature of the research interview. While there is value in a more conceptual presentation of department chairs' leadership practice, the closeness and detail of the narrative positioning analysis ensures that a more conceptual level of analysis is firmly grounded in the reality of the school leadership environment. Finally, combining a comparative approach with narrative positioning analysis accomplished the goal of raising the close, well-grounded narrative analysis to a higher conceptual level. This broader understanding of chairs' instructional leadership can inform research and professional practice in this field.

Directions for Future Research

The leadership environment of a school is an important context for science teaching and learning, and this study helps to fill a gap in the literature by providing a view of high school science department chairs that is focused on instructional leadership. This research also applies analytical approaches—social interactionism rather than role theory, narrative rather than descriptive analysis—suggested by previous authors. This work presents a picture of department chair instructional leadership as multi-faceted and situated within local contexts. The diversity in this analysis and the existing literature suggest this is a fruitful area for continued research. Research articles regularly cite a lack of professional learning for department chairs, and publications aimed at practitioners are limited in availability and lack focus on the instructional aspect of the position. Similarly, practitioner books for high school department chairs often provide long lists of knowledge, skills, and dispositions not easily translated into the daily social interactions comprising the department chair role. In addition, many practitioner publications lack a focus on instruction. It is hoped the portraits of practice presented here provide not a how-to guide but a point of departure for reflection and for the generation of professional knowledge that will inform and enhance the professional practice of high school science department chairs. Further, this work refines a narrative research approach that is novel to science education research and that can be employed to study the situated complexities in the practice of other professionals within the science education field.

CHAPTER 5

MODELING SCIENCE INSTRUCTIONAL LEADERSHIP: A GROUNDED CONCEPTUAL MODEL BASED ON HIGH SCHOOL DEPARTMENT CHAIRS' NARRATIVES OF PROFESSIONAL PRACTICE[3]

[3] Peacock, J.S. To be submitted to the *International Journal of Science Education.*

Abstract

Ongoing reforms in science education call for a major shift in instructional practice, and science department chairs represent an important source of instructional leadership to support such change. However, department chair practice in science instructional leadership is not well understood and not well used in schools. This study built on previous positioning analysis of interview narratives from exemplary science chairs to construct a grounded conceptual models these chairs' instructional leadership practice. The model indicates that chairs enacted leadership within five interrelated domains, and that chairs' practice was constrained by their leadership context. In particular, chairs positioning within the school leadership hierarchy and the pervasive focus on school accountability and assessment shaped chairs' practice. Chairs more often positioned their leadership within a discourse of school improvement than a discourse of science education reform. Important implications for research and practice in the field are discussed in light of the goals of science reforms.

Keywords: constant comparative method, modeling, narrative, positioning, professional practice, instructional leadership, department chairs, science education, high school

Introduction

The publication of *A Framework for K-12 Science Education* by the National Research Council (NRC, 2012) and Achieve, Inc.'s (2013) subsequent release of the Next Generation Science Standards (NGSS) signal "an opportunity to improve science education that comes around once for each generation" (Stage, Asturias, Cheuk, Daro, & Hampton, 2013, p. 277). The *Framework* (NRC, 2012) lays out a vision for science education in which all students "actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields" (pp. 8-9). According to Stage et al. (2013), these scientific practices operationalize the difficult concept of scientific inquiry, and the new standards represent an opportunity to broaden high standards and opportunities for learning science from "a privileged few" (p. 277) to all students. The focus of the standards on college and career readiness, their alignment with the Common Core State Standards in mathematics and English languages arts, and the key involvement of 26 lead states, including Georgia, in their development is

fostering a great sense of optimism and opportunity within the science education community (Stage et al., 2013). While the NGSS will shape science education in the next decade and beyond (Bybee, 2013), the implementation of such a radical shift in science curriculum and instruction faces serious barriers that include resistance to the standards based on the inclusion of evolution and climate science, pushback aimed at a perceived federal takeover of school curriculum associated with the Common Core State Standards, time and resources needed to provide sufficient professional learning for teachers, and development of curriculum and instructional materials (Bybee, 2013; Mervis, 2013; Robelen, 2013; Stage et al., 2013). Alongside this renewed standards movement in science education, teachers face national, state, and local pressures that arise from shrinking school budgets, continued focus on standardized assessment and school accountability measures, and policies that undermine public education.

To provide science teachers with any hope of thriving in this complex and fluid environment and of achieving the vision laid out in the *Framework* and NGSS, science education leaders at all levels must provide ongoing, targeted support and guidance. Because high school teachers strongly identify with the academic department (Melville, Wallace, & Bartley, 2007; Siskin, 1994), science department chairs represent an important source of such leadership. Science departments represent important contexts for professional learning (Melville & Yaxley, 2009), and chairs represent important connections between the department and the field of science education (Melville, Hardy, & Bartley, 2011). Chairs can also be key implementers of curriculum change (Melville, Bartley, & Weinburgh, 2012). Unfortunately department chair leadership practice is not well understood, and department chairs are underused as a resource for improving instruction (Weller, 2001). While researchers regularly argue that high school chairs are in prime position to provide instructional leadership within their departments, research (e.g., Mayers & Zepeda, 2002; Zepeda & Kruskamp, 2007) paints a portrait of the chair as a professional who is asked to do too much in too little time and with too few resources.

Although existing literature provides some guidance as to the conditions and practices that allow department chairs to enact instructional leadership, an empirical answer to the question of how science department chairs can effectively act as instructional leaders within their schools represents a gap in the

science education literature. The comparative analysis of high school science department chairs' positioning within narratives of instructional leadership practice represented a first step toward filling this gap (Chapter 4). That analysis captured the context-dependent and complex nature of chairs' practice, and the narratives generated through that work can provide researchers and chairs with a point of departure for future research and practice. However, the goal of the current work was to complement the close analysis achieved in narrative positioning analysis by constructing a visual conceptual model that raised the analysis to a higher level of abstraction while retaining its grounding in the chairs' narratives.

Models in the social sciences can represent the complex, dynamic, unique, and obscure nature of social systems (Jaccard & Jacoby, 2010). Further, visual modeling is a means of generating and representing theory in a manner that ensures and makes transparent the theoretical grounding of a qualitative study (Jaccard & Jacoby, 2010; Kettley, 2010). In this instance the ability of a visual model to highlight "underlying patterns and concepts" (Briggs, 2007, p. 600) complemented the ability of the previous narrative analysis to capture "the detail of the 'lived experience'" (p. 599). The narrative-based conceptual model and theoretical explanation presented below highlights both the patterns and complexity of the instructional leadership experience of high school science chairs in a manner that contributes both to the research literature and to professional practice.

The research question guiding this work was: How can department chairs' narratives and existing literature inform the construction of a conceptual model of science instructional leadership? I addressed this question by applying a modified constant comparative approach (Charmaz, 2006; Glaser & Strauss, 1967) to generate a grounded conceptual model of chairs' instructional leadership practice. After developing this model, I then connected the concepts comprising the model to the literature on high school department chairs, instructional leadership, and science education leadership (as previously reviewed in Chapter 2). Therefore, I have deferred further discussion of this existing literature until my discussion of the model below.

Study Design and Methodology

The analysis and model development described in this article build on the comparative positioning analysis of science department chairs' narratives of professional practice presented in the author's previous work (Chapter 4). A brief review of that work, along with additional data collection and analysis methods leading to the model development, are detailed below.

Participants and Data Generation

The study employed purposeful network sampling to identify science department chairs in public high schools in Georgia who had served as chairs a minimum of three years and who had been recommended by supervisors or colleagues as exemplary instructional leaders. I contacted 51 science education professionals (including science education faculty, district science supervisors, board members for the Georgia Science Teachers Association, and a program director for a university science outreach unit), and 13 of these professionals recommended a total of 24 chairs who met the study criteria. Eleven of these chairs agreed to participate in a 45 to 90 minute semi-structured interview that focused on each chair's professional practice as it related to enacting instructional leadership within the chair's department. Appendix B provides the interview guide used during these interviews. I also participated in the study by having two colleagues conduct a series of three interviews with me. These interviews followed the same interview guide but occurred at dates throughout the study. These self-interviews provided an opportunity to reflect on my own practice and on affordances and limitations of the narrative interview approach. The full transcripts from these interviews, including the constructed narratives analyzed in Chapter 4 and any remaining non-narrative passages, served as data sources for this analysis. Table 5.1 summarizes demographic characteristics of the participants and the schools in which they worked. None of the chairs received additional release time beyond their regular planning period.

Table 5.1

Summary of Demographic Information for Science Department Chairs Included in Study

Department Chair (Pseudonym)	Sex	Age	Years Teaching	Years as Chair	Annual Stipend	School Setting	Teachers in Department	Schools in District
Alice Brown	Female	48	13	10	$1501-2000	Suburban	11	2
Amy Campbell	Female	50	20	8	<$500	Suburban	11	5
Charles Clark [a]	Male	43	21	7	$2001-2500	Suburban	12	2
Elizabeth Dixon [a]	Female	47	12	4	$501-1000	Suburban	9	5
Melanie Dortman [a]	Female	50	12	4	<$500	Rural	8	1
Judy Gordon [a]	Female	40	18	3	$2001-2500	Suburban	16	5
Brad Johnson [a]	Male	45	22	8	$1501-2000	Suburban	13	5
Abigail Logan	Female	37	10	6	$1001-1500	Urban	8	1
Charlotte Marshall	Female	49	19	5	<$500	Rural	8	1
Ryan Powell [a]	Male	58	9	5	$501-1000	Rural	8	3
Michael Sims [a]	Male	36	7	4	$501-1000	Rural	6	3
Kim Smits [a]	Female	46	15	12	$2001-2500	Suburban	12	5

[a] Marked chairs responded via email to follow-up questions.

As the project evolved, two important developments occurred. First, my early analysis suggested that chairs were not positioning their leadership within a discourse of science education to the degree I had expected. Concurrently, the *Framework* (NRC, 2012) and various drafts and the final version of the NGSS (Achieve, 2013) were released throughout the time of my interviews and analysis. These developments prompted me to send two follow-up questions to the participants via email to probe further chairs' role in connecting their departments to developments in science education. Figure 5.1 provides the text of this follow-up email. Eight of the 12 participants responded to these follow-up items, as indicated in Table 5.1, and all responses became data for the coding process described below.

One theme that is emerging from some interviews and from the research literature is the department chair's role in connecting his or her department to the larger field of science education, including content, scientific inquiry, and curriculum reforms. Please think about this role as you answer the following questions.

- Can you think of an example in which you specifically worked to connect members of your department to the larger field of science education in some way? If so, please explain what happened.
- Have you already or do you have specific plans to work with your department to understand or implement the recommendations of the Framework or the Next Generation Science Standards? If so, please explain what you did or what you plan to do.

Figure 5.1. Text of follow-up email sent to interview participants.

Constructing a Model of Science Department Chairs' Instructional Leadership Practice

The narrative positioning analysis reported in Chapter 4 focused on how chairs positioned themselves with respect to other characters and events in their narratives, to the interviewer, and to cultural discourses. This positioning allowed chairs to generate situated and flexible identities in relation to their practice as instructional leaders, and this analytic approach allowed me to understand how each chair's practice was shaped by context and how that practice shifted under various circumstances. This provided a powerful means to understand the situated complexities (O'Neill, 2000) of chairs' professional

practice. As I began to develop a conceptual model that would raise this close analysis to a theoretical level that might guide future research and practice, I sought to do so in a manner that would generate a substantive theory intimately linked to my empirical data in the tradition of grounded theory (Charmaz, 2006; Glaser & Strauss, 1967) while still honoring the insights gained from positioning analysis. Additionally, I wanted to take advantage of visual concept mapping (Maxwell, 2005) to develop and communicate the structure of this substantive theory—i.e. the relationships among contextual factors, chairs' practice, and desired outcomes—of practice. I pursued these goals by undertaking a process of coding, conceptual integration, and model construction that is detailed below. Table 5.2 provides an overview of this process, and the following sections detail the steps of the analysis. I managed all coding, memo writing, and conceptual integration tasks within the Atlas.ti qualitative data management software package (Muhr, 2010).

Positioning coding. I began this extended analysis by conducting comparative coding (Charmaz, 2006) of the 135 positioning memos generated during the previous comparative positioning analysis. While referring back to the underlying narratives for clarification, I coded primarily with gerunds (Charmaz, 2006) to focus on the common clusters of leadership practices that allowed chairs to enact instructional leadership within their narratives. These clusters of practices are equivalent to Robinson's (2010) notion of leadership capabilities and therefore represent integrated combinations of knowledge and skills employed by the chairs as they worked to influence teachers' instructional decision making. After generating the initial list of positioning codes, I reviewed and compared the associated positioning memos and narratives. Based on this review of data, I refined codes and generated preliminary written notes that focused on the common and divergent features of each positioning code. As I continued the coding process, I revised and expanded these written descriptions to capture the "seamless and dynamic integration of knowledge, skills, and personal qualities" (Robinson, 2010, p. 3) that allowed chairs to enact instructional leadership within their specific school contexts.

Table 5.2

Conceptual Scheme of Coding and Model Development

Coding Level	Description	Guiding Question	Example
Conceptual Model	This level is the general model, including relationships among the leadership domains, factors in the leadership context, and desired outcomes. Generated by analyzing relationships among conceptual categories.	How did the enactment of leadership capabilities/practices relate to one another and to the particular school context?	Full model and explanation
Leadership Domains (Conceptual Categories)	These leadership domains represented the main components of the conceptual model of chairs' instructional leadership practice. Generated through integration of positioning codes.	How can the leadership capabilities be integrated to represent coherent domains of practice employed by chairs to enact instructional leadership within their particular school contexts?	Guiding implementation of school improvement initiatives
Leadership Capabilities (Positioning Codes)	This level comprised the common leadership capabilities that emerged from chairs' positioning within their narratives of instructional leadership. Generated through comparative coding of positioning memos.	What leadership capabilities did chairs reveal through their positioning in relation to their instructional leadership practice?	Facilitating and leading collaboration
Leadership Practices (Detailed Codes)	Detailed codes defined the diversity of specific leadership practices that allowed chairs to negotiate particular positions within their narratives. Generated by closely analyzing actions and evaluations within narratives.	What specific practices allowed chairs to take up certain positions within their narratives?	Leading collaboration within own course team

As noted in Table 5.2, one example of these positioning codes is "Facilitating and leading collaboration." As I reviewed the positioning memos and constructed narratives, much of chairs' interactions with teachers occurred within collaborative groups either at the department or course team level. In addition, chairs positioned themselves as playing a variety of roles within these groups. For at least one chair, Charlotte Marshall, collaborating with teachers in their department represented a strategy to capitalize on the limited time she had available to dedicate to instructional leadership. As Marshall stated, "I find that I don't have as much time as I would like to focus on instructional leadership, but I do believe with small-group collaboration there's been more of that in the last several years." Therefore, collaboration was clearly an important part of chairs' leadership practice.

Beginning the coding process within positioning memos is a major departure from Grounded Theory methods that traditionally would begin with line-by-line coding of interview transcripts. I supplanted that initial coding with the narrative structural and positioning analysis detailed in Chapter 4. Beginning my comparative coding at the level of positioning memos rather than narratives or transcripts foregrounded honored the narrative analysis and chairs' positioning relative to their contexts and larger discourses. In particular, the attention to discourse in the positioning analysis helped to reveal relationships between chairs' school contexts and their leadership practice even though I did not directly observe those contexts.

Detailed coding. After generating positioning codes representing common leadership capabilities enacted by the chairs in the study, I conducted detailed coding of all data. This included the constructed narratives, transcript passages that had not been incorporated into constructed narratives, and follow-up email responses. In this phase of analysis, I focused on close coding of actions and evaluations with the goal of capturing the diversity of specific leadership practices enacted by chairs. This level of coding allowed me to define the specific practices that comprised the leadership capabilities identified by the positioning codes. This phase, like the entire analysis, was an iterative process in that I continuously compared, refined, and collapsed detailed codes based on comparisons of the underlying data. As a result

of the detailed coding, I also refined the positioning codes and expanded their written descriptions to better capture the properties of each code.

Continuing the example from above, it became apparent through detailed coding that chairs' practices within collaborative settings were shaped by the nature of the group. In department-wide collaboration, chairs' often worked to facilitate communication and decision making among the whole group, while balancing the need to give voice to the teachers in the department and to guide the dialogue toward a decision or other endpoint. In these situations, Elizabeth Dixon, for example, worked to ensure that "everybody has a voice…everybody has a part of all the decision making." Chairs took on different roles when it came to collaboration within course teams. In working with teams for courses they were not teaching, chairs often took on coordinating, supporting, and monitoring roles. In these cases, chairs discussed scheduling meetings, helping teachers understand the goals of collaborative work, and communicating with course teams to ensure they were on track relative to schoolwide goals. However, when chairs discussed their work within their own course teams, they often positioned themselves in a multifaceted role in which they attempted to draw on other teachers' expertise and contribute as teachers themselves while also taking a supervisory perspective to keep the work aligned to schoolwide goals. Abigail Logan illustrated this in her discussion of working collaboratively to develop new biology assessments: "we will take the questions…, and we will go through them as a group…, but really my role as instructional leader is making sure that all the objectives are being met." These differences in practice based on specific collaborative groups led me to generate four detailed codes (i.e. leading collaboration within own course team, facilitating collaboration in other course teams, facilitating department-wide collaboration, and collaborating outside the department) that I then grouped beneath the "Facilitating and leading collaboration" positioning code.

Conceptual integration. Working from the list of positioning codes, I integrated these codes into conceptual categories with each category representing a particular leadership domain demonstrated by chairs in the study. To accomplish this, I compared notated codes and the associated data and then grouped codes into coherent clusters that captured chairs' interactions with teachers, administrators, and

with the school context. I used the visual network application within Atlas.ti (Muhr, 2010) to generate concept maps for each category to facilitate my analysis and help me to integrate the categories within my developing theory (Strauss, 1987). The goal of this phase of coding was to raise my analysis to a higher level of abstraction and to form a bridge between my data and my emerging theory (Charmaz, 2006; Glaser & Strauss, 1967). Thus, these categories, or leadership domains, became the main components in my model. Again, this was an iterative process that led me to refine codes and descriptions at all levels. In fact, I continued refining and collapsing codes even as I constructed the code maps presented below.

As I discussed above, collaboration was a key context for chairs' practice. During the analysis, I saw that chairs often worked within collaborative settings to influence teachers' decisions regarding curriculum, instruction, and assessment. Therefore, I generated a conceptual category titled "Influencing curriculum, instruction, and assessment." This category included the three positioning codes "Guiding teachers' instructional practice," "Facilitating and leading collaboration," and "Connecting to science education." As I continued to analyze the detailed codes within this category, I came to see that the vast majority of chairs' practice within this domain was shaped by a schoolwide focus on school improvement and general education reforms. Collaborative teams largely focused on implementing common assessments, chairs guided teachers in implementing school improvement initiatives such as content area literacy, and even chairs' efforts to connect their departments to developments in science education were constrained by these general education initiatives. As a result, I renamed this domain as "Guiding implementation of school improvement initiatives," and I revised the category description to reflect this realization. This example, outlined in Table 5.2 and detailed in this and the previous two sections, illustrates the analytic work that led to the generation of the eight leadership domains that comprise the grounded conceptual model presented below. These eight domains are made up of a total of 16 leadership capabilities underlain by 60 distinct leadership practices. As will be discussed below, these practices, capabilities, and domains are highly interdependent and interconnected, but they do represent the multiplicity and diversity of high school science department chairs' instructional leadership practice.

Emergent theory. The model presented below provides a visual representation of the substantive theory that emerged from my analysis of empirical data in this study. My theoretical grounding in symbolic interactionism, social constructionism, and positioning theory shaped that analysis, but the empirical data directly supported the theoretical generalizations and model that emerged from this analysis. Therefore, the model and explanation describe chairs' instructional leadership practice from the perspective of a situated, interactionist view that provides an important contrast to the static view of role theory that was historically applied to research on high school department chairs.

Three theoretical generalizations emerged from this analysis and guided the development of the model. First, chairs' leadership emerged from ongoing social interactions among specific actors within a particular school context. Thus, changed in those actors or in that context would necessarily lead to changes in chairs' practice. Second, chairs enacted a set of core leadership capabilities that represent the integration of knowledge and skills within a complex social environment. Although there was great diversity across chairs' practice, the five leadership domains represent common features of practice for all chairs in the study. Third, just as chairs positioned themselves within narratives, they constantly positioned themselves within the school leadership context. The chairs in this study literally negotiated the meaning of the chair role and of instructional leadership in a flexible and emergent basis as they positioned themselves and were positioned by others within their social interactions with administrators, teachers, and other stakeholders.

Model construction. In constructing the visual model of my theory, I sought to represent the conceptual categories, their properties, and the relationships among them in a form that was intimately grounded in the data while also allowing me to generate and communicate broader arguments from the data. My approach to modeling drew on several notable sources. I followed Mason's (2002) focus on constructing arguments rather than drawing conclusions from data. This approach is based on the assumption that there are no "self-evidently correct answers" to research questions, and it requires a researcher "to demonstrate to others what led them to suppose that their argument was appropriate or persuasive" (Mason, 2002, p. 173). Construction of a theoretical model also allowed me to address the

criticism from a number of authors that education research, in general, and research in instructional leadership, in particular, often lacks a solid theoretical grounding (Kettley, 2010; Jaccard & Jacoby, 2010; York-Barr & Duke, 2004; Robinson, 2010).

Like other stages of analysis, model construction was an iterative process of sorting, diagramming, and integrating categories into a coherent theory (Charmaz, 2006). I actually began sketching possible model configurations early in the analytic process, and I refined those ideas repeatedly until I felt that the model fit with and encompassed the full range of empirical data (Glaser & Strauss, 1967). The final step in my analysis involved connecting the empirical model to the existing literature on department chair practice, instructional leadership, and science education leadership. The goal of this final step was to produce a model that is equally grounded in existing literature and empirical data and that forms a "bridge between the theoretical thinking" of education researchers and "the practical thinking" of practitioners (Glaser & Strauss, 1967, p. 241). The results of this intensive analytic process are presented in the following sections.

A Grounded Conceptual Model of Science Chairs' Instructional Leadership Practice

The visual conceptual model of science department chairs' instructional leadership is presented in Figure 5.2. In summary, the model represents the following major propositions.

- Science department chair instructional leadership comprised a variety of leadership capabilities falling into the five domains highlighted within the gray rounded rectangle. Although represented by separate objects within the model, these domains were enacted in an interdependent and interconnected manner as represented by the double-headed arrows used in the model.
- This instructional leadership occurred within national, state, and local education policy contexts that heavily influenced the functioning of schools and the leadership and instructional practices within those schools. The focus on school accountability was the dominant factor within this policy context. Budgetary constraints were also important.

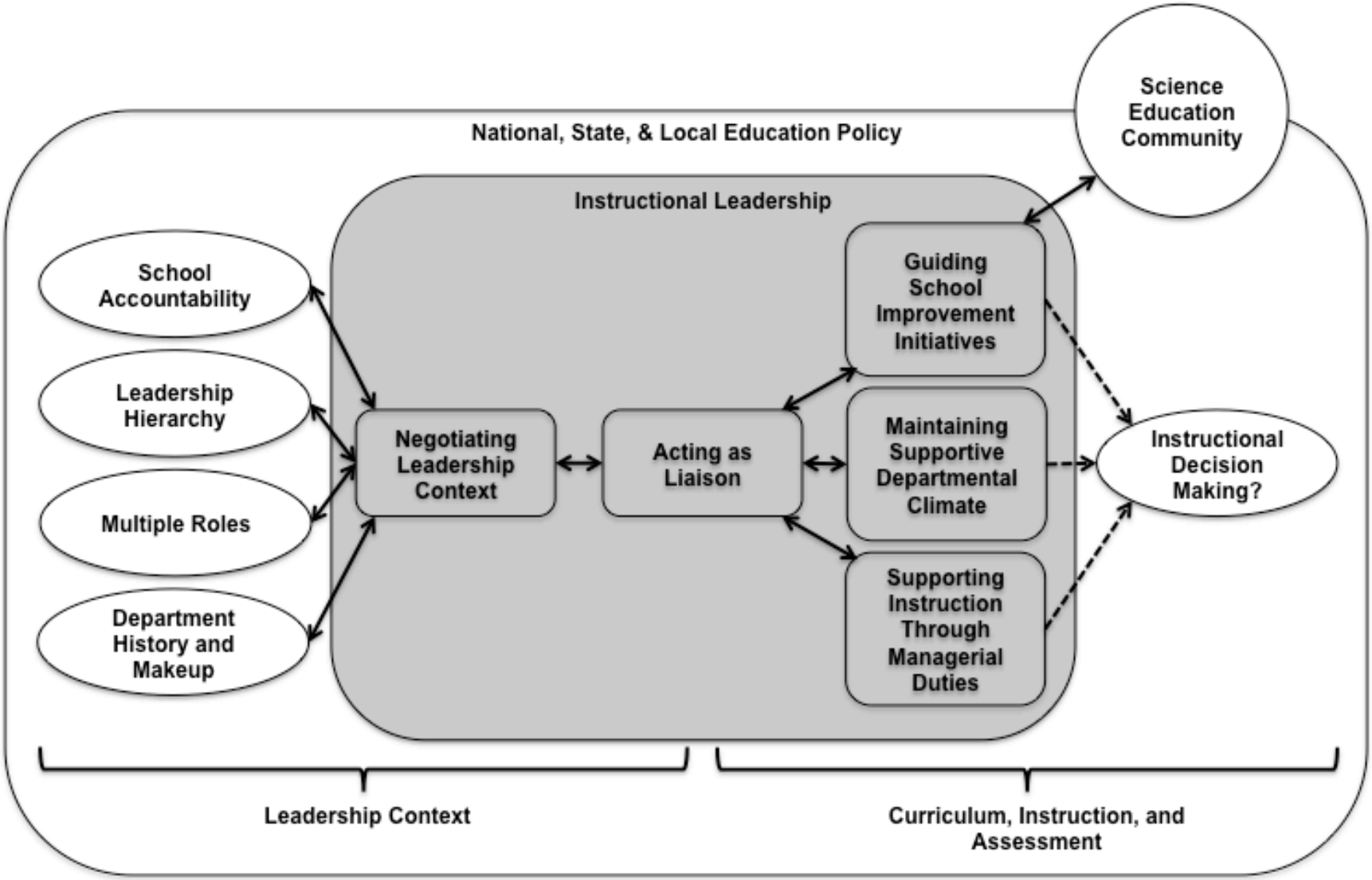

Figure 5.2. Grounded conceptual model of high school science department chairs' instructional leadership practice.

- In order to enact instructional leadership, chairs negotiated a leadership context that was particular to each chair. While each context was unique, four common factors—leadership hierarchy, school accountability, multiple roles, and department history and makeup—dominated these contexts and strongly shaped chairs' leadership practice.
- All chairs, on some level, acted as liaisons to connect the leadership context and administrative bureaucracy to teachers' practice of curriculum, instruction, and assessment. Chairs worked to leverage this position to support instructional improvements within their departments.
- Chairs' major interactions with curriculum, instruction, and assessment came in their role as guides for the implementation of school improvement initiatives. Chairs' worked in a variety of ways to influence, directly and indirectly, teachers' instructional decision making. Also within this domain, some chairs worked to connect their departments to the science education community. Connecting to this community, parts of which operate within and without the education policy context, represents a critical leadership function that was observed, unfortunately, to only a limited degree in the study.
- Chairs worked to maintain a supportive departmental climate that fostered cooperation and collegiality among teachers and that supported teacher morale to the benefit of student learning.
- All chairs hold responsibility for certain managerial tasks, but chairs in this study positioned these managerial processes as an additional means of supporting instruction within their departments.
- While the final goal of instructional leadership is to enhance student learning, this is not shown as the outcome of the model. This recognizes that, ultimately, only teachers change or improve the instruction in their classrooms. Consequently, the goal of instructional leadership becomes to influence teachers' instructional decision making in a

way that supports improvements in teaching and learning. Arrows leading to the endpoint in the model are dashed and a question mark is included in this label to signal uncertainty in this connection. This study did not address teachers' instructional decision making, so this portion of the model is a logical extension and not a grounded concept.

In the following sections, I discuss these propositions in greater detail, while incorporating supporting and contrasting literature throughout the model explanation. I then discuss the theoretical criteria by which I propose this model should be evaluated.

Negotiating the Leadership Context

The dominant theme of the positioning analysis presented in Chapter 4 and within the model presented here is the need for a chair to negotiate a particular school leadership context in order to enact instructional leadership within the school. While each chair's context was different, that context always shaped and constrained the chair's instructional leadership practice. Table 5.3 presents the codes and descriptions for the leadership practices and capabilities comprising this domain. Descriptions in the table are based solely on empirical data. These data and relevant literature are discussed further below.

Within their narratives, chairs positioned themselves in relation to four contextual factors that shaped their practice. The first of these factors, the school leadership hierarchy, varied considerably among schools, resulting in quite different approaches to departmental leadership. Powell, who enjoyed very little administrative support, led in an indirect manner that primarily involved coordinating meetings and communicating information. Clark took a more active approach but, as a result of his elected status as chair, found himself in a tenuous position in which he had "to be very subtle with" influencing teachers. Gordon and Smits operated within well-structured systems of shared leadership, and they took on similarly active roles in aligning the work of their departments to schoolwide goals. Dortman reported that her administrators "really value us as professionals and nobody really gets in our way much," and she mirrored this approach by supporting teachers' creativity and innovation within her department. Campbell positioned her principal as putting "department heads in charge of the department," and she played on that deferred authority to wield the most directive leadership of any of the participants.

Table 5.3

Data Analysis Table for Conceptual Category: Negotiating the Leadership Context

Domain	Chairs' leadership is limited by time and by their ambiguous positioning between teachers and administrators and simultaneously within and parallel to the school leadership hierarchy. Chairs' positioning as leaders was also constrained by larger discourses, such as assessment, accountability, and school funding. The extent to which chairs can productively negotiate these tensions largely determines their potential effectiveness in supporting instruction within their departments. Chairs navigate their tenuous position within the leadership hierarchy through ongoing social negotiations with administrators, by drawing a range of supports within and outside their schools, and by adapting to the constantly changing school context.		
Capabilities	**Negotiating the leadership hierarchy** Chairs' leadership is limited by time, lack of formal authority, and role conflict and ambiguity. The present analysis indicates that this role conflict and ambiguity result from the fact that chairs largely operate parallel to the formal school leadership hierarchy. Chairs' ability to influence teaching and learning within their department is contingent upon their ability to negotiate standing within the leadership hierarchy.	**Balancing multiple roles** Chairs constantly balance the competing demands of meeting the chair's own teaching responsibilities, accomplishing managerial tasks that often carry a deadline, and providing instructional leadership for other teachers in the department. Participants were able to work within the severe time limitations to carve out some time and energy to focus on supporting and improving instruction within their departments.	**Responding to school accountability** School accountability policies, with the resulting focus on standardized testing and a constant stream of school improvement initiatives, dominated the school context for all chairs in the study. Therefore while chairs sometimes critiqued this focus, their attempts at instructional leadership were heavily influenced by considerations of student test scores, graduation requirements, and other accountability measures.
Practices	• ***Taking advantage of administrative support*** – Chairs' ability to enact instructional leadership in a meaningful way ultimately depended on their principal's support. Chairs worked to capitalize on this and on other school-level or district-level supports. • ***Adapting to changing context*** – Chairs were forced to adapting to changes resulting from changes in administrative personnel, new or evolving understandings of school improvement initiatives, shifting administrative focus, or budget cuts. In these cases, chairs worked to maintain focus on instructional improvement while moderating the effects of these changes on teachers. • ***Defining the role*** – Chairs either worked without official job descriptions or found that their actual responsibilities were much broader than the official description. Thus, chairs constantly negotiated their role through interactions with administrators and teachers. • ***Understanding school bureaucracy*** – Chairs applied their understanding, and sometimes critique, of school bureaucracy to understand and enhance their practice. • ***Maintaining relationship with administrators*** – Chairs benefitted from maintaining positive personal relationships with administrators and a positive reputation for their department within the school.	• ***Sacrificing instructional focus*** – Chairs often admitted that they could not dedicate as much time as they would like to instructional leadership, which led them to focus on less direct means of influence. • ***Sacrificing personal time*** – Chairs regularly sacrificed their own time during planning, lunch breaks, and before and after school. • ***Delegating responsibilities*** – Chairs managed time by delegating managerial tasks and by tapping into teacher leadership within their departments. • ***Focusing instructional leadership*** – Chairs indicated that they attempted to prioritize their instructional duties, even in the face of managerial deadlines. They accomplished this by completing managerial tasks efficiently and focusing attention on more important tasks. The general time pressure particularly restricted chairs' ability to engage in strategic planning.	• ***Setting and evaluating departmental goals*** – Chairs generally discussed departmental goals directly in terms of improving student test scores or in terms of implementing initiatives aimed at this target. This emphasis on test scores varied among the chairs but was present with all. • ***Targeting instructional leadership*** – Some chairs specifically targeted their leadership efforts toward courses with required standardized tests. Changes in course sequencing and offerings were also aimed at improving student test scores while meeting graduation requirements. Such targeted leadership followed from and reinforced the schoolwide focus on assessment and accountability. • ***Guiding and evaluating teachers' practice*** – Despite several critiques of the testing culture in schools, chairs' narratives equated student learning to high test scores. As such, many of the chairs' interactions with teachers centered on preparing for or responding to student assessments of some form.

Capabilities	**Balancing leadership approaches** Chairs primarily enacted collegial leadership based on collaboration and facilitation. However, chairs' leadership was shaped by the school leadership context, and chairs modified their leadership approach within specific situations and with particular teachers.	**Leading reflectively** Chairs drew on various funds of leadership knowledge in a reflective manner to adjust their leadership approaches to the particular local context and individual circumstances. This leadership was distinct from instructional leadership that might be enacted by principals or other professionals with different positions within the school leadership structure.
Practices	• ***Leading as a liaison*** – Three chairs—Powell, Johnson, and Brown—positioned their leadership heavily within the liaison role, and these chairs did little more than "push[ing] the administrator's agenda." Powell and Johnson primarily provided indirect support to their teachers. Brown took a more active role in facilitating her department's work in implementing school improvement initiatives. • ***Leading within informal shared leadership*** – Three chairs—Clark, Marshall, and Peacock—positioned themselves as holding various levels of status within loosely structured systems of shared leadership. These chairs were able to move in various degrees beyond the basic liaison role to shape instructional practices within their departments, although these chairs still worked within the school improvement framework. • ***Leading within formal shared leadership*** – Three chairs—Gordon, Smits, and Dixon—positioned themselves within formal shared leadership systems based on a schoolwide leadership team. Each chair provided input into schoolwide goals and exercised considerable leadership in guiding their department's response to those goals. These systems each carried a heavy focus on analyzing and responding to student assessment data. • ***Leading autonomously*** – The two chairs—Campbell and Dortman—who were given the greatest autonomy wielding their influence quite differently. One of those chairs took a directive approach in which she was "in charge" of the department, while the other passed her autonomy on to her teachers and worked to support their innovation. • ***Adjusting approach based on teachers*** – Chairs applied their knowledge of teachers to modify their approach with particular teachers based on the teacher's personality, experience, and level of cooperation. When working with individual teachers, chairs attempted to put themselves "in their shoes" to determine the best ways to support and influence teachers.	• ***Reflecting on and improving practice*** – Chairs actively reflected on their past and future leadership practice during their interviews, and they recounted examples of how they had intentionally altered their practice based on direct experience or professional learning. Reflective practice was as important to these chairs as to the teachers they sought to influence. • ***Applying leadership training*** – Four chairs—Gordon, Peacock, Smits, and Johnson—specifically cited graduate studies or other targeted professional learning in leadership (i.e. educational, instructional, or teacher leadership) as resources for their current leadership practice. These chairs applied general understandings about school bureaucracy and specific leadership skills within their practice. • ***Weighing benefits and responsibilities*** – In discussing becoming and continuing as chairs, participants regularly weighed the benefits and responsibilities of the position with the general consensus being that the basic compensation did not match the demands of the position. Therefore, some chairs indicated the importance of maintaining a passion for the position, and several chairs referred to being involved in or at least knowledgeable about coming decisions major benefits of the role. • ***Leading from experience*** – Chairs drew on their own teaching experience in guiding teachers' instructional decisions. They also acted as reservoirs of institutional knowledge of "what's worked for us in the past."

Existing research reinforces the role of the principal and school leadership structure in supporting chairs' leadership. Klar (2012) found that principals played a critical role in fostering instructional leadership capacity among department chairs. Principals accomplished this by

> (1) cultivating a shared understanding of distributed instructional leadership, (2) providing opportunities to develop instructional leadership capacity, (3) providing opportunities to be instructional leaders, (4) monitoring chairs' needs and adjusting required levels of support and (5) demonstrating a long-term commitment to distributed instructional leadership (p. 193).

Wettersten's (1992; 1993; 1994) work also highlighted the fact that chairs' instructional leadership in any school is intertwined with the principal's leadership.

Chairs' practice was also dominated by the pervasive focus on school accountability and standardized assessments. Chairs regularly positioned their practice in terms of implementing school improvement initiatives, such as common assessment, data-driven instruction, content area literacy, collaborative unit planning, and differentiated instruction. Chairs generally positioned these initiatives more as means to improve student achievement on standardized tests than to improve the student learning experience. The interplay of macro (national and state) and micro (district and school) level policy can create what Johnson (2013) termed "educational turbulence." This dissonance in policy can impede systemic reform. In the current study, the macro-level focus on school accountability and the micro-level enactment of that focus within schools served to constrain chairs' practice and to limit their ability to act as science education leaders and to connect their departments to developments within science education.

As is well documented in the literature (e.g., Feeney, 2009; James, 2001; Mayers & Zepeda, 2002; Zepeda & Kruskamp, 2007), chairs had to balance the competing responsibilities of teaching, managing the department, and enacting instructional leadership. None of the chairs in the study received additional release time to complete their duties as chair. Finally, chairs negotiated their leadership based on the particular history and makeup of their departments. A prime example of this was provided in Dixon's negotiation of her position when she became chair in a newly formed school. Dixon discussed the process of "leading a department of leaders."

> A lot of our teachers had been a, either a science department chair at the former school at one time, or they had been in middle school what they call a lead teacher in middle school, which is pretty much the same type of thing. So, when they, when you, when they come in here, they're the ones used to, you know, pretty much being in charge and having to mesh that together and, professionally, you know, with not, you know, hurting people's feelings or getting their feathers ruffled and things like that was, it was a little challenging, because, and there was a lot of listening.

In another example, Powell's department was shaped by a sense of unity gained when the department was "left on our own" as several faculty left the department to transfer to a new high school. The departments within each school were unique, but departmental communities within each school also varied over time. Multiple chairs expressed how their leadership changed in years when their department consisted of teachers that were more or less resistant to change. My literature review revealed very little work on how departmental composition affects chairs' leadership. However, Skinner (2007) and Willis (2010) each highlight the negotiated and interactional nature of the chair's role.

Acting as a Liaison

The chair's liaison role (Table 5.4) is pervasive in the literature (e.g., Hindman, 1990; Wettersten, 1993) and was fundamental to participants' leadership practice. As noted above, Klar (2012) found that principals could fosters chairs' instructional leadership capacity in part by establishing systems for shared leadership, and Ritchie (2006) has also noted that systems of distributed leadership support chairs' ability to influence their departments. The data in this study supported this concept but raised an important caveat. The three chairs—Dixon, Gordon, and Smits—who experienced the most structured shared leadership systems did position themselves as active and effective guides of the instructional work within their departments. However, these chairs positioned their practice almost exclusively within the discourse of school improvement rather than science education. While these chairs acted on behalf of their departments to participate in setting and implementing schoolwide goals, the school leadership structure did not afford the flexibility to address discipline-specific goals for science teaching.

Table 5.4

Data Analysis Map for Conceptual Category: Acting as a Liaison

Domain	Acting as a liaison is a common duty for chairs, but participants leveraged their position between administrators and teachers to support or enhance instruction. Administrative support and formal structures for shared decision making enhanced chairs' ability to support instruction as liaisons. Within this role, chairs were tasked with implementing general instructional initiatives originating at the state, district, and school levels. Some chairs moved beyond this basic role to initiate instructional improvements themselves or to support teachers' innovations. Within the framework of reform efforts and administrative initiatives, chairs also acted as the voice for their departments at the school level.	
Capabilities	**Aligning department to school improvement initiatives** Even the most autonomous chairs worked within a school improvement framework focused on implementing state standards and attaining or maintaining high student test scores. Thus, a key role for chairs was aligning the work of the department with this school improvement framework. Whether chairs participated in setting schoolwide goals or not, they faced the task of facilitating the implementation of those school goals within the department.	**Representing departmental interests** Chairs regularly positioned themselves as the agent of the department in interactions with school administrators. These interactions included budgeting, goal setting, hiring, scheduling, and relaying teacher concerns. Chairs most often accomplished this within a school leadership team in which the chair served as the department's representative in setting schoolwide goals or developing plans to implement school improvement initiatives.
Practices	• ***Aligning departmental and schoolwide goals*** – Chairs involved their teachers to various degrees in setting departmental goals within the schoolwide framework. Some chairs simply communicated goals to teachers while others provided a choice of areas for focus and still others provided full input as to how the department should approach schoolwide goals. • ***Fostering teacher buy-in*** – Chairs often positioned themselves as salespeople for administrative initiatives, and they largely accomplished this role through dialogues in which they worked to address teachers concerns highlight benefits, downplay novelty and workload, and appeal to shared values. Beyond theses conversations, chairs fostered buy-in by involving teachers in the process, drawing on enthusiasm from early-adopting teachers, and piloting the initiatives within their own classroom. • ***Mediating change*** – Chairs generally supported change by recognizing it as a long-term process and by facilitating teachers' work through the change process. However, some chairs inadvertently inhibited change as they sought buy-in, while others directly expressed frustration with ongoing changes in education. • ***Monitoring department work*** – Chairs monitored the department's work primarily through dialogues within collaborative groups but also through classroom observations and informal interactions.	• ***Participating in schoolwide goal setting*** – Most chairs participated in school leadership teams whose main focus was on setting school improvements goals aimed at improving student achievement on standardized tests. Within these teams, chairs represented their departments by providing input into these goals and by voicing how their department might contribute to the goals. • ***Advocating for departmental initiatives*** – Some chairs lobbied their administration to support various instructional initiatives that originated in the department, either from the chair or from teachers. Chairs sought approval, funding, or other support for these initiatives, which involved tailoring school improvement initiatives specifically to science curriculum and instruction. • ***Voicing teacher concerns to administrators*** – Chairs communicated teachers' concerns about instructional initiatives and other issues to administrators, often selectively passing on only "plausible" concerns for which there might be a resolution. • ***Shielding teachers from bureaucracy*** – Chairs positioned themselves as shielding teachers from excessive workload resulting from multiple preps, bureaucratic responsibilities, or administrative initiatives. The goal of this practice was to allow teachers to focus time and energy on instruction. • ***Balancing departmental interests with student interests*** – Chairs indicated the need to maintain focus on students' interests while representing departmental interests. As one chair put it, "I try to protect my folks...and...do what's best for the children at the same time."

A second key issue addressed in the literature in relation to chairs' role as liaisons is their involvement in mediating school change. Empirical results have been mixed with a general consensus being that chairs can, but do not always, facilitate change (relevant studies include Mayers & Zepeda, 2002; Melville & Barley, 2010; Printy, 2008; Rigano and Ritchie, 2003; Tam, 2010). The current analysis revealed two mechanisms, one intentional and one inadvertent, by which chairs might work against school change. Based on a perceived overemphasis on standardized testing and past experiences in which change initiated by the chair was not supported by the school administration, one chair expressed open hostility toward future curriculum changes. The chair offered the following response to the follow-up question on plans for addressing the NGSS.

> It is time for us to get away from the notion of a one size fits all set of standards for the entire nation. It is time for local communities to regain control of the education of their citizens, and return teaching to a profession where students learn to think. So, my plans for any set of standards that come across my desk are to do nothing until forced to do so at which time I will try to inflict as little grief on the members of my department as I can.

This response may provide an additional example of the educational turbulence (Johnson, 2013) that can lead to unintended consequences as schools implement various reform policies. Another chair expressed a supportive attitude toward school improvement initiatives, but the chair's attempts to gain teacher buy-in for these initiatives likely undermined their full implementation. The chair attempted to minimize the perceived novelty and workload involved in these new initiatives by making statements, such as "we found that we were already doing common core before we ever heard of it." Such an approach can reduce teacher anxiety about a new initiative, but it can also greatly reduce the fidelity of implementation. This is not to say that all chairs in the study resisted change. Other chairs actively supported schoolwide initiatives and even initiated or supported changes from the department level.

Guiding Implementation of School Improvement Initiatives

As noted above, chairs interacted with teachers' instructional decision making most directly as they guided teachers in implementing a variety of school improvement initiatives (Table 5.5). As a result, this domain is the most easily recognized as instructional leadership. Promoting collaboration was the most often cited leadership practice for chairs serving as effective instructional leaders (Aubrey-Hopkins

& James, 2002; Bolam & Turner, 2003; Flores & Roberts, 2008; Kaur, Ferrucci, & Carter, 2004; King, 1991), and chairs in this study most often positioned their instructional leadership within collaborative groups at the level course team or department levels. Chairs also occasionally collaborated with other chairs inside or outside their own school.

According to Helterbran (2008), collaborative planning helps teachers to "identify instructional goals, carefully reflect on what does and does not work in a given school environment and student population, and work together to address weaknesses in the curriculum and instruction offered" (p. 90). Chairs' worked both to facilitate collaborative interactions among teachers and to enact specific practices to influence teachers' decision making within these interactions. Consistent with relevant literature, chairs provided feedback (Aubrey-Hopkins & James, 2002), modeled desired practices (Benedict, 2009), provided situated professional learning (Flores & Roberts, 2008; Melville & Yaxley, 2009), and promoted a clear instructional vision through common curricular and instructional frameworks (Bolam & Turner, 2003; Harris et al., 1995; King, 1991).

A critical finding within this domain, as mentioned above, is the limited extent to which chairs positioned their instructional leadership practice within a discourse of science education. Working with science departments in secondary schools in Australia and Canada, respectively, Melville and colleagues found that teachers more closely identified with the field of science education than with school improvement efforts (Melville, Wallace, & Bartley, 2007) and that chairs could effectively lead science education reform, in part, by successfully connecting their departments to the larger field of science education (Melville, Hardy, & Bartley, 2011). Chairs in the present study largely did not take advantage of this connection, and this raises serious implications, discussed in the closing comments, for coming science education reforms.

Table 5.5

Data Analysis Table for Conceptual Category: Guiding Implementation of School Improvement Initiatives

Domain	With limited time or structural support for instructional leadership, chairs rely on more subtle approaches to influence curriculum, instruction, and assessment within their school context. These activities generally occur within collaborative interactions among teachers but may occur in more formal settings. Modeling was the most common means of influence other teachers' practice, and the chairs role in connecting the department to science education is especially important. Chairs certainly apply knowledge of science content and science teaching within other leadership capabilities, such as collaboration and even managerial duties. However, it is within this capability that chairs most directly apply their understanding of science learners and of effective science curricula, teaching, and assessment.		
Capabilities	**Guiding teachers' instructional practice** In many ways, chairs positioned themselves as instructional coaches, and they tended to influence teachers' instructional decisions within collaborative settings. Further, chairs enacted this influence as they facilitated implementation of various school improvement initiatives, including common assessment, content area literacy, data-driven instruction, and differentiation.	**Facilitating and leading collaboration** It is within collaborative interactions that chairs can most directly apply their knowledge of curriculum, instruction, and assessment to guide the teaching and learning of high school science. Chairs worked to support and guide collaboration at the department and course team levels, and they took active roles within their own course teams. Chairs' practices varied depending on the level of collaborative group.	**Connecting to science education** All chairs apply content expertise as they enact instructional leadership, but at times chairs positioned themselves more explicitly as a bridge between their department and the larger field of science education. This role, like all aspects of chairs' practice, was constrained by the larger school improvement context.
Practices	• *Providing feedback and encouraging reflection* – Through formal and informal observations and other interactions, chairs provided feedback and encouraged teachers to reflect on their instructional practice. Chairs most often positioned this practice as a support for new or struggling teachers and indicated that they were better suited to this role than were administrators with no science background. • *Modeling desired practices* – Chairs positioned themselves as models of desired instructional, classroom management, and professional practices. These desired practices originated from the chair's vision for professionalism and effective teaching or from administrative initiatives. • *Providing situated professional learning* – Chairs often acted as instructional coaches who provided professional learning that was situated within the context of collaborative departmental work. Thus, chairs guided teachers in learning by doing.	• *Leading collaboration within own course team* – Chairs often positioned themselves as leaders and collaborators within the course teams for the classes they were teaching. Chairs often served the dual role of facilitating and monitoring collaboration within the group. In some cases, chairs tapped other teachers to lead the course team, and other teachers often exhibited teacher leadership in these groups. • *Facilitating collaboration in other course teams* – Chairs positioned themselves as facilitators for course team collaboration, particularly when chairs referred to guiding the process or coordinating meetings or goals for classes they were not teaching. Thus, chairs were not acting as equal collaborators in these cases. Rather, they were guiding and overseeing the process, perhaps with the responsibility to report back to the school administration.	• *Integrating schoolwide initiatives with science* – Chairs worked to fit school improvement initiatives into existing science teaching practices ("what does this look like for us") or to integrate science education reforms with broader improvement efforts. • *Promoting inquiry- or lab-based teaching* – Chairs discussed their efforts to promote inquiry- or lab-based teaching or implementation of the science practices outlined in the Framework. Chairs promoted these approaches through modeling, collaboration, promoting student research, purchasing lab technology, or working to increase teachers' understanding of these approaches. • *Implementing STEM programs* – Some chairs were involved in developing or implementing STEM (science, technology, engineering, and mathematics) programs within their schools. The emphasis on training students to enter STEM-related careers is an economic and political trend supported by Georgia's school accountability framework.

	• *Implementing common curriculum or instructional framework* – Chairs positioned themselves as developing, facilitating, monitoring, or supporting common curriculum or instructional frameworks, such as curriculum maps or lesson frameworks.	• *Facilitating department-wide collaboration* – Chairs positioned themselves as facilitators during whole-department meetings and collaborative planning sessions. Chairs participated as colleagues in such collaboration, but they held the parallel responsibilities or coordinating meetings, facilitating discussions or work sessions, and monitoring progress with respect to departmental and schoolwide goals. • *Collaboration outside the department* – Some chairs engaged in collaboration outside the department, i.e. across departments within the school or with science chairs from other schools in the district. These efforts included cross-disciplinary lesson collaboration, implementing a cross-disciplinary (i.e. STEM) program within the school, developing district-wide curriculum maps, or sharing information and ideas across school science departments.	• *Sharing professional information* – Chairs positioned themselves as conduits of information on trends and coming changes in science education by providing teachers with professional articles and other information. • *Advocating targeted professional learning* – Chairs advocated for their school administrators to support professional learning targeted specifically at science education as opposed to learning experiences that addresses general school improvement initiatives. Professional learning requested by chairs included asking outside providers to come into the school, the chair provided structured professional learning, participating in off-site laboratory workshops, or attending science education conferences. • *Seeing the bigger picture* – Chairs discussed their role in seeing how classroom teaching connects to the larger field of science, and they recognized the need for instructional leadership targeted specifically at science.

Some chairs did position themselves as connecting their department to the science education community. Key aspects of this community include discipline-specific instructional resources; research on curriculum, instruction, and assessment in science; and science education reform efforts. The science education community is shown as straddling the boundary of the education policy context to represent that portions of this community operate directly within this context, while other portions operate outside or without regard to education policy.

Among the chairs in the study, Marshall was fairly active in attempting to connect school improvement initiatives with science teaching, and she exemplified two practices that chairs used to do this. Marshall relayed that much of the professional learning provided by her school was targeted at other subjects, such as English or social studies. Marshall enacted two strategies to deal with this situation. Firstly, she worked with her department to "figure out…what does this look like for us." Thus, she was leading her department to integrate a school improvement initiative with their own understanding and practice of teaching science. Secondly, Marshall successfully lobbied with her principal to arrange targeted professional learning sessions for her department. The department alternately attended formal science-specific workshops and conducted teacher-led professional learning within the department.

Table 5.6

Data Analysis Table for Conceptual Category: Maintaining a Supportive Departmental Climate

Domain	Chairs generally aligned themselves much more closely with teachers than with administrators, and many of them took considerable efforts in their narratives to position themselves as equal colleagues with their teachers. Maintaining a supportive, collegial departmental climate provided a foundation for the collaborative work at the center of the department's instructional efforts and allowed chairs to tap into the collective strengths and experience of teachers in the department. All capabilities and practices within this domain heavily overlap with one another.		
Capabilities	**Building community** Productive relationships with and among teachers are at the core of chairs' practice and essential for a functional department. Chairs played an active role in maintaining a productive departmental community based on cooperation, communication, and trust.	**Promoting a collegial climate** Chairs made significant efforts to position themselves as equal contributors to a "team effort" and to highlight teachers' professionalism and expertise. This openness to shared responsibility represented at once an effort to distribute leadership, a practical means of distributing work within the department, and a strategy to foster teacher buy-in.	**Supporting teachers** Chairs worked to support teachers in ways that were not directly related to instruction but that provided a productive departmental climate. One chair summarized the importance of this capability as follows: "I certainly think being happy and feeling appreciated make you perform better in your job."
Practices	• ***Acting as team leader*** – Largely through informal interactions, chairs worked to accommodate teachers with a variety of sometimes "strong" personalities while also meshing teachers into a cohesive team. • ***Maintaining open communication*** – Chairs highlighted the importance of remaining open to listen to teachers and honestly communicating administrative decisions. Communication occurred within meetings and shared lunches and through other informal interactions. • ***Building and maintaining trust*** – Along with open communication, chairs built trust by respecting confidentiality, acting in the department's best interests, and demonstrating a shared focus on student learning.	• ***Exploiting teachers' strengths*** – Chairs often highlighted specific strengths of individuals in their departments, and they drew on these strengths as part of their leadership, particularly in collaborative work. • ***Sharing leadership*** – Beyond simply drawing on teachers' strengths within collaborative settings, chairs also actively shared leadership by designating teacher leaders to head course teams or other small-group departmental efforts. Sharing was based on experience, content expertise, or specific skills. • ***Giving teachers voice in the department*** – Chairs positioned themselves as sharing departmental decision making with teachers. This shared decision making gave teachers voice, empowered them, and engendered teacher buy-in and ownership for instructional initiatives.	• ***Maintaining teacher morale*** – Chairs maintained morale by managing the budgeting process fairly, giving teachers voice in departmental decisions, maintaining open communication, providing a sounding board for teacher venting, maintain a positive climate, leading by example, interacting informally with teachers, and mediating disputes within the department. • ***Mentoring new teachers*** – Chairs often positioned themselves in the role of mentoring or coordinating mentoring for new teachers. Aside from direct instructional guidance coded elsewhere, chairs worked to help new teachers integrate into the department and school communities and develop non-instructional skills needed by teachers. • ***Responding to teacher needs*** – Chairs took on the general responsibility of responding to teacher needs, which often involved support in classroom management.

Maintaining a Supportive Department Culture

Collaboration is supported within a positive and collegial departmental climate, and maintaining such climate was an important leadership domain for chairs in this study (Table 5.6). Both as a recognitions of teachers' professionalism and expertise and as a strategy to deal with limited time, chairs often positioned themselves as relying on teachers in their departments to maintain departmental process and to exercise teacher leadership. This climate of shared leadership, combined with chairs efforts to support teachers and to maintain positive personal relationships resulted in departmental climates that promoted ongoing instructional improvement.

Dixon was the most obvious example of this with her "department of leaders," but other chairs also actively shaped the climate of their departments. Logan emphasized how informal, personal interactions during lunch periods and outside of school created a sense of community; Dortman focused on her role in maintaining departmental morale and in preventing negativity from creeping into the science department from other groups in the school; and Smits discussed how she focused on individuals' strengths as a strategy to deal with teachers whose commitment to the profession did not match her own. Gordon contributed to her department's collegial climate by leading by example. Gordon positioned herself as an equal team member as she stated:

> Honestly, I feel like instructional leadership is the most important role, really, for, my motto is, I don't ask the teachers who teach with me to do anything that I wouldn't do, and that includes teaching honors-level kids as well as special education kids. This particular year, I'm going to have honors chemistry then co-taught physical science, so I've got two extremes on the spectrum, but, I mean, I feel like, that's, that's what everybody has, and so, I feel like I need to lead by example, and so, if I want, you know, if I expect my teachers to use inquiry-based methods, then I need to use inquiry-based methods. If I want them to be dynamic lecturers, then I need to, kind of, be that role.

If Gordon had to approach a teacher about a challenging issue or a less-than-desirable teaching assignment, then she was on solid and equal footing. Facilitating collegiality and shared leadership (Au et al., 2003; Bliss, 1989; Harris et al., 1995; Hofman et al., 2001; Printy, 2008; Wettersten, 1992), maximizing teacher talents and deferring to teacher expertise (Aubrey-Hopkins & James, 2002; Harris et

al., 1995), and building a distinctive departmental culture (Bolam & Turner, 2003) are concepts from the literature that closely align with this domain.

Supporting Instruction Through Managerial Processes

While discussions of chairs' managerial duties are nearly universal in department chair literature, these duties are rarely characterized as instructional leadership. Chairs in this study characterized many managerial duties (e.g., maintaining inventories and checking lesson plans) as simply clerical tasks that detracted from their instructional duties. However, chairs positioned particular aspects of budgeting, scheduling, and hiring as means of strategically supporting instruction within their departments (Table 5.7). Such positioning for managerial duties aligns loosely with Au et al.'s (2003) concept of facilitative enabling, which encompassed allocating resources to support instruction. This domain aligns more closely with the organization management approach to instructional leadership advocated by Horng and Loeb (2010). This approach to instructional leadership emphasizes hiring, assigning, supporting, and retaining high-quality teachers; allocating resources; and maintaining a positive work and learning environment (Horng & Loeb, 2010).

Table 5.7

Data Analysis Table for Conceptual Category: Supporting Instruction Through Managerial Processes

Domain	These managerial processes are often listed as official responsibilities of department chairs in district job descriptions, and these processes do not necessarily rise to the level of instructional leadership. To count as instructional leadership these processes must be carried out with the express purpose of supporting and improving instruction within the department. Managing the budget process or seeking external funds to support specific instructional initiatives, applying content expertise and knowledge of teachers to build a schedule, introducing or modifying courses to support student learning, and applying content knowledge and considering the departmental culture during hiring all push basic managerial processes into the realm of instructional leadership. The chair's role in navigating the bureaucracy in these processes also serves to protect teachers' instructional time and focus.		
Capabilities	**Supporting instruction through budgeting** Chairs dealt with shrinking budgets to obtain and coordinate funding for instructional resources. Chairs managed regular departmental budgets with the express goal of making instructionally sound decisions, made special instructional budget requests, or sought external funding to supplement their regular budget.	**Supporting instruction through scheduling** Chairs applied their knowledge of teachers' strengths, science curricula, and students' needs to support instruction through scheduling and sequencing classes and assigning teachers. Chairs played a consultative role to administrators but provided important expertise for scheduling decisions.	**Supporting instruction through hiring** Chairs supported instruction through hiring by consulting with administrators to facilitate the hiring of candidates who were well-qualified, met the department's instructional needs, and supported or enhanced the departmental culture.
Practices	• ***Managing the budget strategically*** – Chairs worked to prioritize spending based on instructional value, to support teacher flexibility, and to spend strategically for the long-term benefit of the department. At the same time, chairs and teachers were sometimes forced to defer maintenance and to work with limited instructional materials. • ***Requesting special funding*** – Chairs interacted with administrators to request additional funds intended to purchase specific materials like test review books, to support specific instructional approaches such as project-based learning, or to support general instructional needs. • ***Raising external funds*** – Some chairs worked to supplement instructional funds by writing grants, seeking donations from local companies, or conducting fundraisers within the school. These funds supported general laboratory-related spending or to fund specific instructional initiatives.	• ***Supporting student achievement through scheduling and sequencing*** – Some chairs took active roles in altering the course sequence or offerings within their department to support student achievement. Specific changes were aimed at supporting low-performing students, challenging high-performing students, improving student engagement, improve access to challenging curricula, or to provide dedicated work time for student science projects. • ***Supporting teachers through scheduling*** – Chairs indicated various levels of involvement in the process of building the course schedule for their department, and they noted several ways in which they worked to support teachers in ways that are relevant to instruction. Within the scheduling process, chairs worked to honor teacher preferences, manage teachers' workload, distribute teaching assignment equitably, and exploit teachers' content expertise.	• ***Evaluating candidates' fit with the department*** – A more specific practice reported within the hiring process is the chair's role in ensuring that candidates are a good for the department in terms of qualifications and personality. Chairs indicated that they used their content knowledge to assess whether candidates' qualifications met the department's instructional needs. However, some chairs also indicated that they intentionally evaluated how a candidate would support or enhance the departmental culture. Two chairs discussed their desire to maintain a productive departmental climate, while one chair hoped to use the hiring of three new teachers to reinvigorate and to prompt change in her department.

Chairs provided multiple examples of this leadership domain within their narratives. Both Johnson and Smits emphasized the role of hiring in shaping and maintaining departmental culture. Discussing hiring and emphasizing the importance of his close knowledge of his department, Johnson stated, "Fit is something that is so important to me.…And see, I think the administration, those are, some of those nuanced things are the things maybe they don't get." At the time of our interview, Smits looked forward to using the hiring of three new teachers as "kind of an apple cart turnover." Smits explained:

> When you've got new people coming in, and I'm hoping that because we've got so many new, exuberant people coming in, it'll add a little bit of excitement and maybe we can accomplish something that would've been a little but harder when we've got teachers that are on their way out.

A number of chairs initiated changes in their departments' course sequences to support student achievement, and chairs also emphasized the importance of balancing teacher preferences with assigning courses based on teachers' strengths. Chairs also discussed negotiating the school budget process to support or enhance instruction. Logan explained how she carefully considered purchases to determine "what's going to benefit the department in the long run." The author also discussed how he leveraged his relationship with an assistant principal to obtain extra laboratory equipment for the department.

Evaluating the Model

At heart, this is a narrative study, and Polkinghorne (2007) argued that an important goal of narrative research is to produce knowledge claims that "can serve as a basis for understanding of and action in the human realm" (p. 476). Through the model and explanation above, I have presented a set of knowledge claims that can guide understanding and action in the realm of science chairs' instructional leadership practice. Acknowledging the diversity of approaches to constructing and evaluating such knowledge claims, Clandinin and Connelly (2000) suggest researchers be explicit within their investigations as to the criteria by which they wish to be judged. Therefore, I will set out the criteria by which the model presented here should be evaluated.

Jaccard and Jacoby (2010) argued that the primary criterion for evaluating models is the extent to which "they serve as useful guides to the world we experience" (p. 31). Beyond this, Jaccard and Jacoby

cite Shaw and Costanzo's (1982, as cited in Jaccard & Jacoby, 2010) nine criteria for evaluating theories. In this view, the first three criteria—internally consistent logic, agree with known data, and testable—are required for acceptance of a theory, while the remaining criteria—understandable and well communicated, parsimonious, consistent with current theories, broad scope, novelty, and generative—are desirable characteristics. These criteria cannot be applied in an absolute fashion. As examples, novelty and consistency with established theories are conflicting criteria and otherwise weak theories may generate considerable amounts of new research. While acknowledging traditional views of theoretical criteria similar to those laid out by Shaw and Constanzo (1982, as cited in Jaccard & Jacoby, 2010), Glaser and Strauss (1967) argued the method of theory development is as important as the theory itself. These authors also offered specific criteria for evaluating grounded theory (Glaser & Strauss, 1967), which Charmaz (2006) summarized as "a close fit with the data, usefulness, conceptual density, durability over time, modifiability, and explanatory power" (p. 6).

Also related to the method and as noted previously, Mason (2002) noted the need for a researcher to be explicit in guiding readers through the processes that lead from raw data to theoretical arguments. Kettley (2010) argued that theory should comprise "powerful social explanations" (p. 41) that (a) "must be derived from robust empirical…observations…derived from a methodological framework consistent with the interpretive schemas and theory building strategies used to generate the social explanation" (p. 42-43); (b) "must account for the totality of cases of a phenomenon, in a given spatial and temporal location, and also enable an understanding of individual variations in the experiences constituting the relational whole" (p. 43); (c) "require acknowledgement of the indivisible and continuous qualities of everyday life, because understandings of human relationships should be contiguous with the social structure" (p. 43); and (d) "should transform both the internal procedure of education studies…and the external recommendations provided to teachers, managers and policy-makers" (p. 43).

Synthesizing the criteria discussed above, I propose that a theory and associated model should (a) contain internally consistent logic, (b) be grounded in rigorous empirical investigation, (c) be grounded in appropriate social theory (e.g., symbolic interactionism, social constructionism, and positioning theory),

(d) provide a strong social explanation of the phenomenon, (e) lay clear for the reader the path from data to theoretical arguments, and (f) contribute to both educational research and practice. I have attempted to address each of these criteria in the current work, and I leave it to the reader to evaluate the model presented here against these criteria.

Closing Comments

The model and theoretical explanation presented above represent a series of arguments that arose from my analysis of the empirical data in this study. These arguments add to the limited but growing research on the role of science department chairs in supporting instructional improvement and curriculum reforms within their departments, and they stand on their own as guides for research and practice in this area. However, certain aspects of these arguments deserve additional emphasis here owing to their particularly important implications for research and practice.

First, the key finding of this study bears repeating. As noted, chairs' leadership practice was constrained by their school contexts, most notably by the chair's positioning within the school leadership hierarchy and by administrative initiatives driven by general education reforms. As a result, chairs generally positioned their leadership within discourses of assessment, accountability, and general school improvement measures and not within the discourse of science education. It is important to recall that science education professionals recommended the participants. Even so, these chairs did not position their leadership practice in a way that would support science education reforms such as those recommended by the *Framework* (NRC, 2012) document. While chairs represent an important potential resource for supporting curriculum reforms in science education, the findings of this study indicate that many chairs are seriously constrained in their ability to fulfill this potential. Future research must address how chairs and other science education leaders can successfully connect departments to the science education community and support the implementation of the community's vision for science education. Other implications for research and practice are discussed below.

From a methodological perspective, this study validates Skinner's (2007) and Willis' (2010) findings that department chairs' practice is highly interactional and is negotiated through personal

relationships. Chairs in this study enacted a wide range of specific leadership practices within complex and shifting social contexts. Chairs enacted this leadership primarily through their social interactions with teachers and administrators. The grounded modeling approach, layered on top of the narrative positioning analysis presented earlier, accomplished the goal of raising the close narrative analysis to a more abstract level that can inform research and practice. As O'Neill (2000) suggested, narrative methods provide a fruitful means to capture the complexity of chairs' leadership practice, and the grounded modeling approach should also be considered as an important tool in expanding our understanding of this practice. In future studies, case study methods likely represent an important complement to the solely interview-based research presented here.

In terms of future research on instructional leadership in science, science education researchers must not lose sight of the larger context of education. The important reforms called for in the *Framework* (NRC, 2012) and NGSS (Achieve, 2013) will not be implemented in a vacuum. Rather, they will be implemented within the same climate of accountability and assessment that constrained the chairs in this study. Keeping this in mind, future research is needed in three main areas. First, researchers should seek to identify and understand the practice of chairs who are able to connect their departments to reform efforts in science education and to the science education community, in general. Second, researchers should directly investigate the relationships among chairs and teachers to better understand how chairs' instructional leadership is translated into changes in teachers' instructional decision making. Third, researchers should explore the interactions between chairs' and administrators' enactment of instructional leadership within schools. These last two efforts will require teachers and administrators to be involved in future studies.

In order to support proposed science education reforms, schools and chairs must alter their policies and practices in several ways. First and foremost, schools must provide chairs with sufficient time to complete their multiple roles and responsibilities. Second, schools and principals must work to empower chairs within their school leadership structure to move beyond general school improvement efforts to guide change that is tailored to science teaching and learning. Principals can follow Klar's

(2012) recommendations, discussed above, for fostering instructional leadership among chairs. Finally, schools or districts can provide professional learning focused on educational and instructional leadership. The chairs in this study who had experienced such professional learning within their district or in graduate programs spoke to the direct benefits of these experiences.

Science department chairs, to act as science education leaders in addition to school improvement leaders, can also draw on the findings of this study to shift their own practice. While chairs should continue to enact the five leadership domains represented in the model, they must work to elevate connecting the department to the science education community to the status of a separate leadership domain. This domain should encompass three key leadership capabilities. First chairs must take on the responsibility of educating school administrators regarding the vision, methods, and expected outcomes of science education reforms. Saginor (2006) argued that effective reform occurs only when the school principal initiates or enthusiastically endorses a shift, and the findings of this study corroborate the important influence that the principal and the larger context of school improvement has on instructional practice within science departments. Second, chairs must shift their leadership approach to that of a content area coach supporting situated and discipline-specific professional learning within the department. Such professional learning should serve to gain teacher buy-in and to help teachers develop the capabilities needed to support reform-based teaching and learning. In this role, chairs would focus on translating school improvement initiatives in light of their understanding of research-based best practices for science teaching. Melville, Hardy, and Bartley (2011) outlined three characteristics—a focus on and commitment to reform, an understanding of how to wield influence to promote reform, and the ability bridge the department with the larger field of science education—needed for chairs to effectively foster reform within science departments. Finally, chairs can act to connect their teachers to resources available to support curriculum, instruction, and assessment within the science education community. These combined efforts can help to translate the current optimism surrounding science education reform among science education professionals into the reality of improved science learning for students.

CHAPTER 6

CONCLUSION

As science teachers face major reforms in curriculum, instruction, and assessment, leaders at all levels must provide leadership and support that allows teachers to implement a new vision for science education within a challenging social, political, and economic climate. High school department chairs hold prime position to provide such leadership, but this role is under-researched and under-used within schools. Lack of time and authority and role conflict and ambiguity limit chairs' effectiveness. Instructional leadership practice of science chairs represents a gap in the literature. Therefore, this dissertation presented a four-part attempt to add to the limited research knowledge in this area. This work combined a historical review of literature on the department chair, a descriptive survey of science department chairs across Georgia, a narrative interview study with exemplary science chairs, and development of a grounded conceptual model based on those interviews. This combination of approaches allowed me to gain a broad perspective on the opportunities and challenges that face science chairs.

Chapter 1 introduced the problem for study by presenting a constructed narrative from a novice science chair. We conducted this interview during the pilot phase of this project and the chair's realization that "you've got to kind of make your own leadership role" helped shape this research project and helps to set the stage for the dissertation. The analysis of that narrative, combining structural and positioning analysis of a chair's constructed narrative, lays the foundation for the conceptual framework for the entire study. The chapter built on this foundation to outline the influences of symbolic interactionism, narrative analysis, and Grounded Theory on the conceptual framework.

Chapter 2 continued to develop the conceptual framework for this dissertation through a review of historical literature on department chairs, along with reviews of literature on instructional leadership, science education leadership, and modeling within education research. That literature review revealed a number of important themes that must inform any research on high school department chairs. These

themes are largely captured in Axley's (1947) comparison of the department chair to "a race horse with plow-horse duties." That is, while the chair is in an ideal position to exert positive influence on instructional practice within a department, the literature indicates that these professionals are asked to do too much with too few resources in too little time. The chapter concludes with a literature-based conceptual model that provides one theoretical target for science instructional leadership.

Chapter 3 presented the results of a descriptive survey of instructional leadership practices among science chairs across Georgia. A total of 146 science chairs from public high schools across Georgia responded to a combination of selected- and open-response items examining to what extent and how chairs work within existing limitations to provide instructional leadership within their departments. Quantitative and thematic analysis of survey responses led to a conceptual model in which chairs defined their role as instructional leaders as they negotiated a range of supporting and limiting factors within their school contexts and as they prioritized instructional leadership among other duties. Survey findings underscored the value of providing chairs with sufficient time and support to complete instructional duties. Further, a model developed from survey data provided a roadmap of how chairs build on supports and negotiate limitations to enact leadership within schools.

Chapter 4 developed a comparative approach to narrative positioning analysis and presented findings from interviews with 11 exemplary science chairs and self-interviews with the author. This research approach was intended to move beyond role theory to investigate the complex social interactions that allow chairs to enact instructional leadership in order to inform research and practice in this area. This chapter explored how chairs' discursive positioning during research interviews allowed them to generate professional knowledge regarding their leadership practice. Chairs' leadership practice was strongly shaped by their school context and particularly by their positioning within the school leadership hierarchy.

Chapter 5 built on the previous analysis to develop a conceptual model of chairs' instructional leadership practice that was jointly grounded in empirical data and existing literature. The model indicated that chairs enacted leadership within five interrelated domains, and that chairs' practice was

constrained by their leadership context. In particular, chairs positioning within the school leadership hierarchy and the pervasive focus on school accountability and assessment shaped chairs' practice. Chairs more often positioned their leadership within a discourse of school improvement than science education reform.

Overall, this research points to important implications for research, policy, and practice. In terms of research, more work is needed to explicate the interactions between chairs and teachers and how these interactions lead teachers to alter their instructional decision making. In terms of policy and practice, two important implications are that principals can manipulate the school leadership structure to empower chairs' as instructional leaders and that chairs must act to educate teachers and administrators regarding the vision for science education reforms. Chairs need additional time to complete their instructional duties, targeted training and a leadership structure that empowers them within a system of shared leadership, and administrative support in relation to science education reforms. Chairs also must work intentionally to serve as a bridge between their departments and the larger field of science education.

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APPENDICES

APPENDIX A

SURVEY CONCEPT MAP AND QUESTIONNAIRE

Questionnaire Concept Map

CONCEPTUAL TOPIC	Corresponding Questions
Working Context as Department Chair	
School Context	
Currently Department Chair	• Question 1
School Setting	• Question 2
District Size	• Question 3
School Size	• Question 4
Department Size	• Question 5
School Schedule	• Question 6
Teaching Responsibilities	
Grades Taught	• Question 7
Levels Taught	• Question 8
Subjects Taught	• Question 9
Department Chair Roles	
Priority of Instructional Leadership Among Other Roles	• Questions 10,11
Responsibility for Teacher Evaluation	• Question 12
Fit with Ideal Image of Department Chair Roles	• Question 13*
Compensation	
Release Time	• Questions 14,15
Remuneration	• Questions 16,17
Involvement in Instructional Decisions	
Involvement of School Stakeholders	• Questions 18*,19*
Department Chair Involvement	• Questions 18*,20*
Desired Involvement	• Question 21*
Enactment of Instructional Leadership	
Instructional Leadership Practice (open response)	• Question 22
Instructional Leadership Practice (selected response) – The following practices were derived from existing literature as noted below. • Solving complex problems (Robinson, 2010) • Building relational trust (Hoy et al., 2006; Robinson, 2010) • Applying your knowledge of science content and pedagogy (Bliss, 1989; Robinson, 2010; Stein & Nelson, 2003; Wettersten, 1992) • Serving as bridge between teachers and administration (Duke, 1990; Wettersten, 1992) • Promoting collaboration in planning, instruction, and assessment (Aubrey-Hopkins & James, 2002; Bolam & Turner, 2003; Flores & Roberts, 2008; Kaur et al, 2004; King, 1991) • Promoting a common instructional vision with high expectations	• Question 23

(Benedict, 2009; Bolam & Turner, 2003; Harris et al., 1995; Hofman et al., 2001; Kelley et al., 2010; King, 1991) • Monitoring departmental performance in instruction and student learning (Benedict, 2009; Harris et al., 1995; Hofman et al., 2001; Kelley et al., 2010) • Using department meetings and formal and informal departmental communications (Aubrey-Hopkins & James, 2002) • Providing direct, positive feedback to teachers (Aubrey-Hopkins & James, 2002) • Promoting effective use of material and human resources (Harris et al., 1995) • Supporting and shielding teachers from non-instructional tasks (McGuigan & Hoy, 2006) • Modeling desired teacher behaviors (Benedict, 2009) • Promoting alignment with local, state, and national standards (Kaur et al., 2004)	
Influences on Leadership Practices	• Question 24
Supports and Constraints for Instructional Leadership	
Supports for Instructional Leadership	• Questions 25,26
Constraints on Instructional Leadership	• Questions 27,28
Path to the Position	
Teaching Experience	• Question 29
Department Chair Experience	• Question 30
How department chair came into position	• Question 31
Motivation for becoming department chair	• Question 32
Demographics	
Age	• Question 33
Certification	• Question 34
Education	• Questions 35,36

**Note.* Questions 13, 18, 19, 20, and 21 were adapted from Adduci et al. (1990).

Science Department Chair Instructional Leadership

Science Department Chair Instructional Leadership Questionnaire

As a science department chair, you play a key role in science education for Georgia's high school students. The goal of this study is to understand and to inform science department chairs' practice as instructional leaders. Please answer each of the following questions as completely and honestly as possible.

***1. Are you currently the science department chair for your high school?**

- ◯ Yes
- ◯ No

School Setting and Work Environment

The items in this first section will ask you to describe your school setting and work environment.

2. Which best describes your school setting?

- ◯ Rural
- ◯ Suburban
- ◯ Urban

3. How many high schools are there in your school district?

4. How many students are in your school?

- ◯ <500
- ◯ 501-1000
- ◯ 1001-1500
- ◯ 1501-2000
- ◯ 2001-2500
- ◯ >2500

5. How many full-time equivalent teachers are currently in your department?

6. What is the number and length, in minutes, of class periods in your school's daily schedule?

Number

Length (minutes)

Teaching Responsibilities

The following items will ask about your teaching responsibilities.

Science Department Chair Instructional Leadership

7. Which grades do you teach currently?

- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12

8. Which course level(s) do you teach? (Please check all that apply)

- ☐ Advanced, Accelerated, or Honors
- ☐ General
- ☐ Remedial
- ☐ Special Education Collaborative
- ☐ Other (please specify)

9. Which subjects do you teach? (Please check all that apply)

- ☐ Biology
- ☐ Chemistry
- ☐ Earth Systems
- ☐ Environmental Science
- ☐ Forensic Science
- ☐ Human Anatomy & Physiology
- ☐ Physical Science
- ☐ Physics
- ☐ Other (please specify)

Department Chair Role

The items in this section will ask you to describe some general aspects of your role, including instructional leadership, as the science department chair for your school. Please consider instructional leadership to be any actions you take with the goals of influencing your teachers' instructional decisions and improving science teaching and learning within your department.

10. Approximately what percentage of your work time do you spend on each of the following types of activities?

Managerial	
Instructional Leadership	
Teaching	
Other (Please specify)	

Science Department Chair Instructional Leadership

11. Please briefly explain how you prioritize instructional leadership (i.e. influencing teachers' instructional decision-making) among your other duties as a science department chair.

12. In what capacity are you responsible for evaluating or providing instructional supervision to the teachers in your department? (Please check all that apply)

- ☐ Formal evaluation
- ☐ Clinical supervision
- ☐ Peer coaching
- ☐ Informal classroom observations
- ☐ Other (please specify)
- ☐ Mentoring new teachers
- ☐ Reviewing lesson plans
- ☐ Reviewing assessment data

13. Think about your ideal image of your responsibilities as a science department chair. How well do your current responsibilities fit with this image of what you should be doing as a science department chair?

- ◯ Good fit
- ◯ Not enough focus on _____ (Please specify in box below)
- ◯ Too much focus on _____ (Please specify in box below)

Please specify here

Department Chair Role, continued

14. Do you receive release time from your teaching duties to accomplish your duties as science department chair?
(If "No," please skip to question 16.)

- ◯ Yes
- ◯ No

Science Department Chair Instructional Leadership

15. If yes, how many class periods are you released from teaching duties beyond your normal planning period?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ Other (please specify)

16. Do you receive monetary compensation in addition to your teaching salary for your duties as science department chair?
(If "No," please skip to question 18.)

- ◯ Yes
- ◯ No

17. If yes, how much additional compensation do you receive per year?

- ◯ <$500
- ◯ $501-1000
- ◯ $1001-1500
- ◯ $1501-2000
- ◯ $2001-2500
- ◯ >$2500

Instructional Decision Making

The next set of items will assess your involvement in instructional decisions affecting your department.

18. Please briefly describe your role in making and implementing instructional decisions that affect your department.

19. Who has the most influence over instructional decisions affecting your department?

- ◯ District-level administrators
- ◯ School-level administrators
- ◯ You (department chair)
- ◯ Other (please specify)
- ◯ Teachers
- ◯ Decisions are made collaboratively

Science Department Chair Instructional Leadership

20. How much influence do you have on instructional decisions affecting your department?

◯ None ◯ Not much ◯ Some ◯ A lot

21. Compared to your current level of influence, how much influence should you have on instructional decisions affecting your department?

◯ Less than current ◯ Same as current ◯ More than currently

Instructional Leadership Practices

The following items will ask you to describe the ways in which you enact instructional leadership within your department. Please think about any actions you take with the goals of influencing your teachers' instructional decisions and improving science teaching and learning within your department.

22. Please describe your most effective instructional leadership practice

23. Below are some instructional leadership practices that other department chairs have reported are important in their efforts to influence teachers' instructional practice. How important is each of the following in your own efforts to influence your teachers' instructional decisions and improving science teaching and learning within your department?

	Not Important	Slightly Important	Moderately Important	Very Important
Solving complex problems	◯	◯	◯	◯
Building relational trust	◯	◯	◯	◯
Applying your knowledge of science content and pedagogy	◯	◯	◯	◯
Serving as bridge between teachers and administration	◯	◯	◯	◯
Promoting collaboration in planning, instruction, and assessment	◯	◯	◯	◯
Promoting a common instructional vision with high expectations	◯	◯	◯	◯
Monitoring departmental performance in instruction and student learning	◯	◯	◯	◯
Using department meetings and formal and informal departmental communications	◯	◯	◯	◯
Providing direct, positive feedback to teachers	◯	◯	◯	◯
Promoting effective use of material and human resources	◯	◯	◯	◯
Supporting and shielding teachers from non-instructional tasks	◯	◯	◯	◯
Modeling desired teacher behaviors	◯	◯	◯	◯
Promoting alignment with local, state, and national standards	◯	◯	◯	◯

Science Department Chair Instructional Leadership

24. Which factors most directly influence your choice of leadership practices? (Please check all that apply)

- ☐ Academic coursework
- ☐ Professional experience
- ☐ Professional learning
- ☐ Other (please specify)
- ☐ Principal leadership
- ☐ Education research

School Factors Affecting Instructional Leadership

Items in this section will ask you to think about factors within your school that act as supports and constraints in relation to your role as an instructional leader within your department.

25. Think of factors within your school that support your role as an instructional leader within your department. Describe one factor that is important in supporting your role as an instructional leader.

26. Which of the following factors support your role as an instructional leader within your department? (Please check all that apply)

- ☐ Professional learning
- ☐ Principal leadership
- ☐ Time
- ☐ Compensation
- ☐ Other (please specify)
- ☐ Job expectations
- ☐ Collaboration with other department chairs
- ☐ School culture

27. Think of factors within your school that limit your role as an instructional leader within your department. Describe one factor that is important in limiting your role as an instructional leader.

Science Department Chair Instructional Leadership

28. Which of the following factors constrain your role as an instructional leader within your department? (Please check all that apply)

- ☐ Professional learning
- ☐ Principal leadership
- ☐ Time
- ☐ Compensation
- ☐ Other (please specify)
- ☐ Job expectations
- ☐ Collaboration with other department chairs
- ☐ School culture

Becoming a Department Chair

This section asks a few questions about how you became a science department chair.

29. How many years, as of the end of this school year, have you been a teacher?

30. How many years, as of the end of this school year, have you served as a science department chair?

31. How were you selected as science department chair in your school?

- ○ Appointed by principal
- ○ Elected by department teachers
- ○ Other (please specify)

32. Which of the following best describes your motivation for becoming science department chair? (Please check all that apply)

- ☐ Additional pay
- ☐ Release time
- ☐ Prestige
- ☐ Assigned by principal
- ☐ Other (please specify)
- ☐ Transition to administrative position
- ☐ Opportunity to provide leadership within my school
- ☐ Opportunity to improve student learning within my department

Demographics

Science Department Chair Instructional Leadership

This final section asks a few general questions about you.

33. What is your age?

34. In which area(s) do you hold a valid professional certificate? (Please check all that apply)

- ☐ Biology
- ☐ Chemistry
- ☐ Physics
- ☐ General Science
- ☐ Educational Leadership
- ☐ Other (please specify)

35. What is your highest degree obtained?

- ○ Bachelor's degree
- ○ Master's degree
- ○ Specialist degree
- ○ Doctoral degree
- ○ Other (please specify)

36. In which area(s) do you hold a degree? (Please check all that apply)

- ☐ Biology
- ☐ Chemistry
- ☐ Physics
- ☐ Science Education
- ☐ Secondary Education
- ☐ Curriculum & Instruction
- ☐ Educational Leadership
- ☐ Other (please specify)

APPENDIX B

SEMI-STRUCTURED INTERVIEW GUIDE

1. Please take a few moments to complete the demographic profile sheet provided.

My goal is to analyze the narratives, or stories, of exemplary science department chairs who act as instructional leaders within their departments. As you respond to my questions, please share any stories that come to mind in as much detail as possible.

2. Tell me the story of how you came to your current position as science department chair at your school.
3. To what extent do you see yourself as an instructional leader within your department? How did you come to see yourself in that role?
4. Think of a specific example of acting as instructional leader in the department and tell me about that time.
5. Think of a typical week of a department chair. How do you carry out instructional leadership within your other roles as a department chair?
6. Think of a time when you faced a barrier to acting as an instructional leader, and tell me how you accomplished your role in the face of that barrier.
7. Think of a time when someone or something in your school supported your role as an instructional leader, and tell me about how that helped you accomplish your role.
8. How does your role in instructional leadership fit into the overall leadership structure of your school? Try to think of a specific example and tell me about that.
9. Is there anything that we have not discussed that you feel is important?

APPENDIX C

ORIGINAL TRANSCRIPT FOR CHARLES CLARK'S NARRATIVE ON INFLUENCING TEACHER PRACTICE

Transcription conventions used:
Interviewer (Author) = Bold Type
Interviewee (Charles Clark) = Regular Type

A second, or, a few minutes ago you mentioned, you mentioned reading and writing and you had tried to, I guess, influence other teachers to incorporate that, so how did you approach that?

Right. Well, so, some of the teachers that I know who struggle a little bit with assessment, some of my teachers are really good at that and doing well. I don't necessarily worry about those. So, I'm going to target the ones that I know who are struggling with that. Now, and so, so you have to be very subtle with it, because I don't, you know I don't have any ability to make anybody do anything. No hire and fire, you know, I can give an NI now and then, but that just pisses them off, you know what I'm saying? That's not, that's not going to accomplish anything. It would be nice if there were three categories on that form. That's what we need, you know, we need, we need an NI, but we also need something else or not needs improvement but we need an NI and U, you know. So, we need an NI that doesn't do anything but also focuses them, I hope, I can do that better, so, so that you can create goals from that. Now, it's just punishment, you know what I'm saying, it's not a very good, well, it's not designed very well, particularly if someone like me is doing the observing, which if they're going to put me, you know what I'm saying, they'll just say, we don't want you anymore, you're giving too many NIs, you know what I'm saying?

Yeah, yeah,

So, that's kind of ridiculous. That's, that's not very smart.

Right, it's kind of working against you.

Yeah, it is. So I have to, it's a political thing, you know, I guess. Now I know what it's like to be in a political situation. But, in, in, in that kind of thing, you know, is that I've been trained in the reading across the content area, and so, I take some of those strategies and will, you know, now and again, I'll just, hey let me show you this. I was thinking about you, and I'll just show it to them on the board. I'll say, why not try this and see how it works, and then we'll discuss it after they try it, and they'll talk about well, this was the problem. OK, well let's think through that how can we best, and so what I'm dong is trying to, is repair the places that I think need to incorporate that more, you know, and do those kinds of things so that helps. And, they try them, and then they'll forget about it afterward. So, that's, that's what I'm, and but it's, it's short and it's not much, and I don't have time to do a lot with it, but I do make a point to do it once a month or something like that to a teacher, a couple of teachers. And it's good to introduce it in the CCC meetings, or whatever it's called, I can't remember, there's five acronyms we have for these meetings. It's all the same thing, but I don't know what they really, you know, it's the physical science meetings, so yeah. So, that would be something more that I do.

APPENDIX D

SELECTED SAMPLE NARRATIVES

Alice Brown
Narrative 3: Facilitating the Development of Common Assessments

1. Abstract: Working on common assessments
Well, this year we, we started, let me back up a little bit.
We started under the leadership of a different principal about five, six years ago to work on what we call common assessments.

2. Orientation: Revamping the common assessments
We did some work with those as a department, and then that kind of all fell by the wayside.
We never completed that work.
So, in the last year that work has been revamped to some degree,
but we're redoing everything of course and realigning our standards to our test questions.

3. Complicating action: Working on common assessments
We're looking at all our test questions.
We're developing the common test questions that we use,
and right now we're working on summative common assessments.
And the plan is then to go back and pull out formative…
we're going to use the backward design process to pull out formative…
We have summative assessments both at the end of the semester for those classes that are not EOCT classes and at the end of each unit, correct.

4. Orientation: Responding to a new administrative push
Well, partially we had an administrative change, and he believes in that.

5. Evaluation: Sharing ideas and strengths
And, my teachers were all very excited about it, because we believe in it too.
Simply because of the sharing of ideas.
I'm not a very creative person;
I'm a very analytical person,
and I need both those skills to be an effective classroom teacher,
so I borrow other people's creativity, and I loan my analytical skills,
and so that's why teams work better, basically.
I actually happen to love genetics,
I hate plants, I could care less about botany,
so when I have to do that unit, I work with someone who has a passion for it, so I can at least give that borrowed passion to my students, you know.
They've got all they need in genetics, but I just don't have it in botany,
so, and when you're assessing test questions, it takes more than one pair of eyes to really catch everything that's in there,
because really even when we have a group of three or four working, when we went back the last time, we're like, oh we all missed this the first time around, so.

6. Evaluation: Getting the extra push
It's just been that the focus hasn't been there,
and we haven't gotten that extra push
and we now have common time where the teachers are required to work,
and so that helps.
It's not planning time…
It's just a common time,
and it's actually afterschool time.
It would be nice to have common planning time by subject area at least,
but that, I don't know if that will ever happen.

7. Orientation: Using common work time
So, we have, like, sacred Mondays.
So, everybody stays after Mondays and works,
and next year I think that will change somewhat.
The principal will decide what day he would designate as our working day.

8. Evaluation: Working well together
Now, some of my subject area teams, like the biology team has always been really good about meeting on their own and planning together.
And physical science not as much, depending on the teachers involved.
So, even before the sacred Mondays they actually worked well together.
They just didn't have a focus like the common assessments.

9. Complicating action: Facilitating and working as part of the team
Basically, I split the teams up, 'cause you know how it is.
There's teachers that teach both life science and physical science.
So, we, I developed a working schedule so that you could participate on more than one team but assign you a priority team.
So, you got your priority team,
but at some point you will get to work with the other team to at least keep up with what's going on and get your input heard.
So, I did that portion of it, I assigned team leaders to each of the priority teams.
I kind of go from team to team a little bit.

10. Evaluation: Facilitating, not leading
I tend to stay more with the life sciences, because that's where my focus is now,
but I'm not the team leader.
I am participating as a teacher,
and I see my role as kind of to make certain that the teams are on track and that I give them,
I've given some instruction as to how to do this,
I, because I'm one of the older-both chronologically and professionally-in my department, a lot of my teachers haven't had training in how to write test questions, how to use backward design,
and so I have set down with them as a group and gone over some of that.
But then when it's time to actually do the process, I only jump in there if I feel like I'm really needed, you know.
Like, have you thought about maybe doing it this way or that way?
They're much more creative than I am, so I can trust that part of it.
One thing that we did recently, we took our, we wrote the test…

11. Complicating action: Reassessing curriculum units
We went back and reassessed our units to make sure that we were comfortable with those.
We did make one change, but for the most part our units stayed the same.
So, we had agreement on those,
and then we started with, well we had a common pretest and a common final we've been using,

12. Evaluation: Unsatisfied with pretest and final exam
but we're not happy with those. We're going to redo those, too, and that's why I haven't really mentioned them up 'til now.

13. Complicating action: Reassessing curriculum units
So, we're pretending like we're starting from scratch even though there's some pieces left over from previously,
we're pretending like we're starting from scratch.
So, we worked to develop the first unit test together, and we did that during the year.
And then toward the end of the year we went back, and we've got, I think three out of six units done.

14. Evaluation: Time consuming
It's very time consuming, if you do it…

15. Complicating action: Analyzing a unit test
So then toward the end of the year we took the first unit test,
and we went back and I put it in a grid.
Everybody had a portion of the test that they were responsible for, you know, cells, organisms, organization of life, whatever,
and then we met as a group.
We went through the questions,
and if we didn't like this question, we discussed it, we said why,
we might have changed it, we might have thrown it out completely, you know,
and we ended up with a test.
Then I took that test and I put it in a grid and I took the grid and I took it back to the committee and we aligned it to each standard.
OK, so every question on there has been aligned to a standard.
We're making sure that we're covering the power standards and that we don't have, that we're not too heavy in one area, which sometimes tends to happen.
And then, we aligned it to Bloom's.
We were going to use depth of knowledge, but our county, I talked to our curriculum director at the county level, and she said use Bloom's because everybody has a better understanding of that.
So, we used Bloom's, and we went back and assigned each question a level on Bloom's taxonomy.

16. Resolution: Overemphasis on lower-level thinking
And, it was interesting, because we're science people, we thought that we would have more application and analyzing and evaluating, and what we saw was that we probably had a good 50% recall.
And we know we're going to have more recall on there, but I think we're going to go back and revamp some of the question…
…Yeah, so it's an ongoing process.

17. Evaluation: Autonomy and standards
I suspect it'll take another year or two to go through all six units in depth the way that we really want to and then to start pulling out those formative assessments from that.
The plan is to maintain autonomy in the classroom as far as how you teach it,
but all students should be learning the same material.

18. Coda: Responding to standardized testing
So, they all pretty much agree that you should be tested on the same material,
and unfortunately because of standardized testing that's the way it goes…

Amy Campbell
Narrative 3: Improving Test Scores

1. Abstract: Increasing emphasis on end-of-course tests
With my veteran teachers, what we've been focusing on, really for the last couple of years with the change on EOCT emphasis and biology, is our EOCT scores,

2. Orientation: Low test scores
well about three years ago for the general bio, they were at a 59% pass rate, and yeah, it's not good.

3. Complicating action: Focusing on test preparation
So, really started focusing with them on different types of looping and different types of questioning, using your warm-ups and stuff on doing test prep and making sure that I've got the test prep books available for them.
And, over the past three years, we've pulled up, last year was a 69, and this year we were at a 78% pass rate,
so we've pulled it, and a lot if it is just working with the teachers, especially with the biology teachers

4. Complicating action/Evaluation: Using common curriculum maps
We've been doing common curriculum maps, oh we've been doing that for years, and that, mainly for, well for resources and numerous things.
We do a common curriculum map, and that's really to make sure that everybody's following the standards, especially when we went from QCCs to GPS, because at first there was zero change in how people were teaching, and there had to be change.
I mean, the GPS and the QCCs are very different, and I had some teachers that, pretty much, their view was teach by the textbook, in order of the textbook, or teach from the textbook, and it wasn't working, so we worked with the county, working with our science coordinator, and all that, put together curriculum maps and tried to keep people following.
Again, I don't tell everybody you have to be on the same unit at the same time, we kind of switch things around a little bit.

5. Evaluation: Comparing common planning in different subject areas
I teach honors bio, and I will purposely be on a different unit than regular bio.
That's mainly for resources.
Yeah, but I want all my regular bio making sure that no matter whose class somebody comes into, they're getting exactly the same standards.
And, bio, bio teachers, I have found, are the hardest, to make sure that happens.
My chemistry, they do it and they follow it.
And, of course my school's unique to me.
At one of the other schools in the district, that just won't do, play well with others.
I'm in a very lucky position.
My chemistry teachers co-plan, co-teach, work really well together.
My physical science is getting better.
Physics is fabulous.
Bio, we're getting there.

6. Complicating action: Encouraging common planning
We've tried doing the, with the meeting together, and all that, where we'll encourage,
and finally it's to the point, because I've got one or two, really right now one personality where I just have to make it, it's a requirement, you have to come, you have to meet, this is the agenda, this is what we're doing, and you have to do it.
And now, once those parameters were finally set, this year went real well,
and she's now meeting with the other teachers, and she's suddenly discovered, you know, life is a little easier if I play well with others,

7. *Resolution: Teachers co-planning independently*

and it's gotten to the point now where, with those meeting, I don't need to be involved anymore. They can set them, and whereas at first I needed to pretty much lead them, but now they run on their own.

And, and it's just time to introduce new strategies, as well, when I get resources or strategies and that, I just say, OK, let's try this.

8. *Coda: Being happy with progress*

But, sometimes you just get happy that they're co-planning and understand that that's, you know, good enough.

The, all the little understanding by design and learning focused and flipping the classroom and this idea and that idea, sometimes they're good, but sometimes you just get happy that people area co-planning and actually working together.

Elizabeth Dixon
Narrative 4: Leading a Department of Leaders

1. Abstract: Leading a department of leaders
A lot of our teachers had been a, either a science department chair at the former school at one time, or they had been in middle school what they call a lead teacher in middle school, which is pretty much the same type of thing.

2. Orientation: Used to being in charge
So, when they, when you, when they come in here, they're the ones used to, you know, pretty much being in charge

3. Evaluation: Challenging to mesh department together
and having to mesh that together and, professionally, you know, with not, you know, hurting people's feelings or getting their feathers ruffled and things like that was, it was a little challenging, because,

4. Complicating action: There was a lot of listening
and there was a lot of listening.
I mean, everybody really had to do a lot of listening to each other, because that's just, you just had so much experience to draw from,
and, you know, a lot of teachers, like the couple that came from, one of them that came from the middle school, she has a hard adjustment, I think, to the high school.
She's been in middle school for a while.
So, that was an adjustment for her,

5. Evaluation: Used to doing things a certain way
and then, you know, they're used to doing things a certain way, and then, you're coming into a new administration that wants is done different than any place you've ever been or they've ever been, so there was a lot of listening, and you had to communicate quite a bit.

6. Complicating action: Using meetings to make department gel
I mean, we had meetings a lot in order to make that department, you know, make the department gel and to hear each other out and know where everybody's coming from.

7. Orientation: Everybody has a voice
Everybody has a voice, you know, everybody has a part of all the decision making, you know, we can't, and everybody has a role, so it's not just one or two people in charge of, you know, certain things.
We have a lot of, we have common core teams, and we have common core team leaders.
So, there's a biology team leader, there's a physical science team leader, there's a chemistry team leader, and so forth.
They're, we're looking at, you know, the common core.
We have one of our teachers in charge of common core and that implementation.
We have someone else that's in charge of our common district assessments, you know those kinds of things.

8. Resolution: Everybody has a leadership role
Everybody has a very important leadership role in the department,

9. Coda: Reducing stress
and it's, I think that's helped quite a bit, and it's certainly taken a lot of stress off of me.

Melanie Dortman
Narrative 2: Collaboration and Peer Coaching

1. Orientation: Leading within a teacher-driven school structure
I would say that I, I'm more of a facilitator.
Our, school has been very, teacher-driven, not in the classroom, but for leadership, what-not, our principal has always allowed us to do whatever we wanted to do as long as we're doing an excellent job and getting it all done right.
So, that being said, I, kind of, have the same type of leadership style, where as long as everybody's doing a great job at what they're doing, I'm happy and just real supportive of them.
We do a lot, we have, our schedule is such that every Thursday morning we have an hour and a half of, it's called teacher, teacher time, t-3 Thursdays, so students come in late, and we get, that's our, kind of, department time or our collaborative time or our, if we have to have a faculty meeting, we'll put it then.
So, that's built into our schedule, and we usually have department meetings once or twice a month, once a month, on those Thursday mornings.
So, usually during that time, you know, we'll bring up any departmental issues,
I'll bring up issues, I'll ask them if they have any questions on it or not, and, so we kind of work more as a team, than I do, I feel like, as a leader, you know, telling them what to do.
But, I have such good team players, you know, so I've got a really, really dynamic group.
So, because we're spread all different ages, I had one teacher who just basically came out of college and then I have one who has taught in college situations all the way through.
We've got a really great group of dynamics and ideas that we share,

2. Abstract: Starting a peer coaching program
and, this year we started doing something different, which was peer coaching,

3. Complicating action: Teachers initiating the program
and actually two of the teachers, they were kind of a natural pair to do it,
and so, they watched each other teach.
I was there really just to kind of support them and make sure it was OK to do it and try and help cover their classes if I needed to,

4. Evaluation: Supporting an effective program
but it was a real effective program that they started.
And, I, you know like I said, I'm really there just to support everybody, that's it,
if you're wondering what my leadership style is, that's it, I'm support.
But, this was real effective, and the rest of the school wants to do it.

5. Complicating action: Facilitating acceptance of the program
We talked about it, as, as a department,
we talked about it, how can we become better teachers, all of us, we all need to always become better teachers.

6. Evaluation: Drawing on different strengths
We all have different strengths, and we need to,
you know, that's kind of scary for some people, to get, to get their peers to coach them,

7. Complicating action: Facilitating acceptance of the program
but we just basically set it out there and said, OK, we all know that nobody's perfect, you know, we need to not take it as criticism, but just as constructive criticism, and, and work together on it.

8. Resolution: Establishing the program
And so, this year, I think that they did it, probably about four or five times, that's all, but that's still pretty good.

9. Coda: Planning for next year

And then, we're going to work on it more next year, and pair up more people in the department next year.

Judy Gordon
Narrative 5: Applying Skills from Graduate Training in Teacher Leadership

1. Orientation: Graduate training in teacher leadership
My degree did have a huge, it had a huge impact on my role a department chair, my classes were, they had you know big fancy names, but basically they were about mentoring and about building a community, and we had the basic research classes, but it was about, you know, in your school, you know, what can you do to effect change and what can you do to support change or, you know, giving you the tools step up and say, you know, this shouldn't, this isn't going to work, you know, you're killing us here,

2. Evaluation: Applying skills from graduate training in teacher leadership
and, and I've used the skills I've had, I guess, every year,
let's see, for about the last five years, I've been a mentor to either a new teacher or a struggling teacher, so that's played a big role in it,
and they've all, they've all been science teachers,
but I think even if I went outside the science department, if they needed help with something, I think I would have the skills to do that because of the classes that I had. Another, in another one of my classes, we studied the Japanese lesson study model, where, kind of, where you work as instructional teams and you observe each other and, you know, you kind of modify, you know, based on observations, and then somebody else teaches the lesson,
and we employed a little bit of that with our collaboration,
and I hope that with our common planning time, we'll get to do more of that, and that was something I learned about there, as well.

3. Orientation: Supporting science fair
We don't require our students to do science fair,
we will provide them the support if they decide that they want to do, but it's not a requirement,

4. Abstract: Advocating to manage teachers' workload
but, you know, every year, we get, why don't we do science fair, why don't we require our kids to do science fair, and I finally was talking to my administrator one day

5. Complicating action: Negotiating with administration on behalf of teachers
and was like, think about all of the kids that would do science fair, they're in two or three AP classes, they are involved in clubs or their church or something, you know, they're very involved, so we would have a very small number that would truly be, you know, invested in doing it,
I said, and then, look at the load these teachers already have,
I said, we'll do science fair if you agree to take something off their plates, you know, if I ask them to take on this extra responsibility, then what are we going to take off their plate,

6. Evaluation: Benefitting from personal relationship with administrator
and she just kind of, and I'm fortunate that we have a relationship that we can, you know, talk like that and we can agree to disagree and be happy to agree when we do agree,

7. Complicating action: Gaining administrative understanding of teacher workload
and she just looked at me and said I never thought about it like that.
I said, I'm serious,
I said, I'm not trying to be ugly, but if we can figure out a way to make their lives easier and to do the science fair, then I'm all in,
I said, I don't think it's fair to ask them to do more when we're being consistently given less,

8. Resolution: Negotiating with administration on behalf of teachers
and she's not asked me to do is since [laughter], and she, but she'll use that example often,

9. Evaluation: Drawing confidence from graduate training

but it is, you know, we do have that kind of relationship that I don't think, I don't think five or six years ago I would have had the nerve nor the confidence to say that,
because I think teachers by nature tend to be, kind of, sacrificial, you know, they'll keep going and going and going until they're just exhausted,
and, you know, had I not had those classes, and had I not taken back and looked at, at that point in time what was starting to go down in education, budgets were dropping and class sizes were going up and that kind of thing,
I don't think I would've had the skills or the background knowledge to give me the confidence to say that, even though we are friends and colleagues, and we do have that kind of, you know, relationship, and so, you know, I think it gave me more confidence,

10. Coda: Drawing confidence from graduate training

I don't think I would have been as confident of a department chair had I not been finishing that program and had completed that, that program, just for that background.

Brad Johnson
Narrative 8: Seeing the Bigger Connections

1. *Abstract: Instructional leader identity*

Would I see myself as an instructional leader for my department?

2. *Evaluation: Instructional leadership by request*

Uh…yes, among the teachers that avail themselves of what I have to say.
Well, there are those in the department who, you know, they, they have all the answers.
They, they don't want any help.
They want to be left alone.
I've, you know, in their defense, I'm probably one of those, you know, just stay out of my way.
That's the way I would be.
But, if somebody comes along with, you know, an issue, like do you know a good video for this or what lab have you done with this or…that kind of stuff.
You know, just collaboration stuff.

3. *Evaluation: Instructional leadership through modeling*

So, that's how, and I guess just role modeling is important, too.
Well…I place a very high value on relationships with students.
To me until you, somebody whose a block of ice with the kids, you know, they're not going to get through.
So, I think that I role model that, you know, in the way that I treat kids, in the way I interact with kids. I think teachers see that.
I think content knowledge, you know, I think in my content area, I can demonstrate that I know what in the heck I'm talking about, you know. [Laughs]
And that kind of thing.

4. *Complicating action: Example of direct feedback to teacher*

And, you know, even, like I walked by one biology teacher's room, here, I was on my planning period when I walked by her room,
and she was up there lecturing and she said statistics show that one in three people has a parasitic worm.
So she says look on right your and on your left, one of you has a worm.

5. *Evaluation: Inaccurate statement*

And so, what kind of a dumb statement is that, right?

6. *Complicating action: Providing feedback*

And so, I had to figure out, I diplomatically tried to say, you know, maybe you ought to look at that.
And I tried to do it, well, it's just, just gently.
You know, are you talking globally here?
I just said I think something's wrong here.
I talked to her just in conversation.
I didn't go I didn't go I got you, that kind of thing.

7. *Evaluation: Seeing bigger connections*

And I said I'm sure it something she heard somewhere like on History Channel or something, but I mean…
So yeah, that's important I think that there's somebody in the school that, you know, sees the bigger connections and doesn't say dopey stuff like that. [Laughs]
But, anyway.
She tries hard.
She's a good teacher.
It was just a, you know, a dumb thing to say.

I've done it, too, I'm sure.
She was, she…very, she's a good teacher, good relationships with kids, very organized, follows the standards anally.
She's just very unsure of her, you know, who she is as a teacher.
And that's another, just knowing you teachers, you know how to approach them a little better.
You know, you don't…tell them they don't know what they're talking about, you know maybe you ought to look at that a little differently.

8. Resolution: Correcting the misstep?
I don't know if she ever went back and said, you know, I was wrong to the kids.

9. Coda: Instructional leadership
But that was kind of a glaring instructional leadership thing.

Abigail Logan
Narrative 5: Participating in Decision Making - Moving to International Baccalaureate

1. Evaluation: Participating in decision making?
Yes, depending on the subject, but yes, for the most part, yes.
I mean, our administrative team is really good about asking for input about things.
There's always going to be things where they come and say, this is what's happening and this is what you need to tell your people.

2. Abstract: Moving to the IB curriculum
But, like this whole move to IB, they listened to our concerns.

3. Orientation: Trying to be inclusive
We had tried really hard to open up our AP program and make it inclusive instead of exclusive,

4. Evaluation: Wanted to be inclusive
and so we really wanted to make IB as inclusive as possible, not that everyone's going to go out with an IB diploma,

5. Complicating action: Looking at IB coursework
so we really looked at the different coursework.

6. Orientation: Science course sequence
I don't know if you remember, but our biology kids, they take it in eleventh grade for the first time, they take the physics-chemistry-bio,
and even doing the standard level biology, you know there's standard level and upper level with IB.

7. Evaluation: We really pushed for it
So, standard level over two years, looking at the curriculum, I was like, this is doable, even by some of our worst kids, our lower level kids.
Are they going to pass the IB test, probably not, but why not expose them to this curriculum?
So, you know, in that respect, they took what we had to say, you know, we're fortunate that two of our administrative team leaders are ex-science teachers,

8. Complicating action: Let's do this
so they were like, oh yeah, so let's do this.

9. Resolution: IB biology for all students
So, starting next year, everybody will take IB biology, every single student.

10. Evaluation: Challenging all students
So, that's one class, and every student will also take IB psychology, so that's two classes that every student in our high school will walk away with taking an IB-level class, which I think is great

11. Coda: We really pushed for it
and wouldn't have happened, I don't know, if we hadn't been on the team, because we really pushed for it.

Charlotte Marshall
Narrative 9: Advocating for Subject-specific Professional Learning

1. Abstract: Advocating for subject-specific professional learning
One thing that we did last is I asked our principal if he would, we had two work days, and if he would allow our professional learning to be held at the local college,

2. Orientation: Working with the school calendar
and he actually, and he, actually we had a teacher workday, we needed to be there three days I believe,

3. Complicating action: Drawing on administrative support for professional learning
and we went two days,
and what he did was one was a teacher work day,
then he paid for subs to come in on that next day, so that we could finish everything.

4. Evaluation: Desiring targeted professional learning
And we would still like to go back.

5. Resolution: Taking advantage of administrative support
So, we did that,

6. Evaluation: Not being too afraid to ask for support
and, and sometimes it's just not being too afraid to ask, and things are really stressful this year, so I haven't asked for too much.

7. Orientation: Drawing on teachers' skills to advocate for professional learning
We did ask if we could go, if we could send several teachers to Atlanta to the National Science Teacher convention,
and that was approved,
but now our new teacher on staff, he wrote that up,
he said, I'll write that up for y'all,
he said, I know how to get, because he helped in his previous county all the time with grants and everything.

8. Evaluation: Drawing on teachers' skills to advocate for professional learning
So, like I said, he's a great addition.

9. Orientation: Attending a science education conference
Three of us are going.
It's women, because it's cheaper for either all males or all women to go,
so the guys, we said, now you men can go, and they said, no we don't want to go, we'll wait [laughter].
So, we do things like that,

10. Evaluation: Being proactive in advocating for professional learning
and we're also trying to be proactive so that we can have professional learning that pertains to us.
So, we're, we're trying to find webinars and various things that we can do to provide our own professional learning,
so that we're not, our teachers really just want to like…[makes negative gesture]
...because it's [inaudible, makes gesture] ridiculous [whispering] when you sit through something that doesn't…pertain to you.
And we feel sorry for the teachers who are asked to come in with us,
because if it's predominantly science and you have a few career tech people and you're just, I mean, I must say that our new teacher is also helping with our professional development.
He says it's going to be a lot different this year.

I said, well we're going to hold you to that.
But it was really good.
We had our first teacher workday, goodness, last week maybe, week before last, and it was, it was really good.

11. Coda: Applying professional learning in the classroom
I mean, I feel like I walked away with something that I could use in my classroom, and that's what it's all about, something practical.

Ryan Powell
Narrative 7: Addressing Teacher and Student Needs to Maintain High Test Scores

1. Abstract: Working to improve test scores
I think we all wanted to improve our test scores.

2. Evaluation: Competing with in-district schools
We all saw the goal out there that we wanted to be the best.
I think some, it is competition, even though it wasn't supposed to be competition.
We're both two schools supposedly achieving the same goals, you know,
but, you know, we didn't want to lag behind.
We wanted our scores to be, match those scores, it won't be said that, but that's some of it.
I'm just going to tell you, that's some of it.

3. Complicating action: Meeting with teachers about test scores
I think, and we, and then I made it a point to meet with the teachers
and say, alright guys, you know, we're here, we're up there, and we're being recognized for being up,

4. Orientation: Being recognized for improved test scores
because we had been recognized on the district level, and we'd been recognized on the local level, we'd been, we'd been, you know, recognized at the beginning of the school when all the teachers meet with the principal, the principal recognized, science scores, bam, you know, science scores, bam, you know, it was almost like everybody was getting tired of hearing science scores,

5. Complicating action: Supporting teachers to maintain test scores
and said, we've got to maintain this, you know, so what can I do as department chair to help you, or help us be able to stay here, or maintain this.

6. Resolution: Collaborating to maintain test scores
So you know, I approached them, all of them together, and I think that because we, you know, tend to work as a unit that that, you know, I've tried to address those needs.

7. Evaluation: Collaborating to address individual teacher needs
Have there been individual needs in some cases?
In some cases, yes.
In some cases, I think that's where we said, well let's just get out our, you know, our lessons, and see how we can tweak or what we can change, how we can use a better lab or improve things, and we, so we'd break into biology and physical science, those teachers would discuss what's going on and what ways they could change or improve what they're doing.

8. Evaluation: Checking on students' previous test scores
Another thing I think that our teachers do that has been helpful, they literally are on top of looking at the roster of kids previous to them coming in and looking at their middle school, like if they're teaching ninth-grade biology, they're checking what they're doing in the eighth grade to see that, where did that come from?
That came from whenever we had our STEM grant, and we were under a PRISM STEM grant thing that we were, had a grant here in the county that, science and math, and we worked on vertical alignment from middle school to high school, and that's kind of where that came from.
That's why they're checking to see what their scores are in science areas and areas that are science and math areas.

9. Coda: Identifying student needs to improve test scores
So, they know a lot about the kids when they're coming to them as ninth-graders and so forth.
So, we're doing more of that, I think that helps, what those student needs are.

Michael Sims
Narrative 1: Guiding a New Instructional Initiative

1. Orientation: Thinking about the next move
Okay, yeah, so the last interview that I did was the previous summer.
And so, at that time and the beginning of this year, well in that interview I talked a lot about our common assessment and collaborative planning, kind of, initiatives,
and so coming in to this year those were in place and were, you know, those were still ongoing, but my role in maintaining those was pretty minimal.
You know, people were basically, you know, were to the point where they were doing that on their own with just some input here and there from me.
So, so, but during the fall I went to a workshop with a couple other folks from school related to the common core literacy standards for science and social studies,
and so that, I guess, got me thinking about moving to the next, 'cause I think the thing is I do better when, as far as leading the people in the department when there's a specific initiative to work on rather than just, kind of, everyday things.

2. Abstract: Taking the next step for the department
So, the literacy standards got me thinking about the next step that we needed to take,

3. Complicating action: Assessing current practice
and at that workshop I made the plan to come back and have a department meeting and just sit down with the teachers and say, you know, look at the standards together and just talk about what are the things we're doing now, what are things that we can, you know, new things we can do and came up with the idea then of doing some kind of coordinated writing tasks,

4. Evaluation: Setting a common goal for the department
since that was the focus of the literacy standards, writing and, reading and writing, but the writing I thought was where you could focus on actually, you know, the kids developing a product.
So, we would come up with some kind of, you know, coordinated writing tasks for the department and kind of move on from there.

5. Orientation: Incorporating new science standards
And, I think that meeting was in the fall and I think we didn't really, didn't really make any moves on that for a while, just with other things going on.
So then, in April I went to the NARST conference, and I had, well, to back up.
I think, even before I went to the NARST conference we did have that, let's see.
In the meantime, the framework for the new science standards came out and the science practices and descriptions of those came out,

6. Complicating action: Addressing both literacy and science standards
and so we did have a department meeting where we looked at both the, both the literacy standards and the science practices and did what I said earlier, just had the department members say, you know what are things that we do now that align to these things and what are new things that we can do,

7. Evaluation: Setting a clear path for the department
and so I tried to run that, you know, the meeting it was, I mean I had a clear plan of what we were going to do, but, you know, I tried to just, set up that topic and then let people, the people in the department give input and,

8. Complicating action: Acting on departmental suggestion
and one of them actually came up with pretty much the same idea that I had before about doing coordinated writing tasks, but they, they, suggested it in terms of doing a lab report.

9. Orientation: Planning common writing tasks
So, it would be, we'd have a standard lab report rubric, you know, where in 9th grade it would be at this

level and then 10th, 11th, 12th, that level that, what we'd expect would increase and we'd pull in the literacy standards and the science practices through that.

10. Complicating action: Incorporating science practices
So, we just, so at the, at the end of that meeting the plan was just to meet monthly and continue to work and discuss some of those things,
and I had asked, I think I had asked people, you know, before we met the next time to just try to incorporate the practices in some way in their class, and then we would come back and talk about it,

11. Orientation: Implementing a collaborative initiative
so that was the plan, just to have monthly meetings, you know, and report back and kind of develop that together.

12. Complicating action: Participating in professional learning
So then, I went to the NARST meeting in April and attended presentations on argumentation and modeling, which are two of the practices, right?

13. Evaluation: Targeting specific practices
And so, what I, I realized that there were some good resources for those, and I also realized, you know, thinking about those eight practices that those were the two that were the least familiar to teachers.
The things like investigations and asking questions, teachers are familiar with those and can do those, but argumentation and modeling are new things for most people, for all, and even for me.

14. Complicating action: Drawing on professional contacts
So, so at the conference I attended those sessions and got some, you know, new background and made a couple of contacts to get information from, but I also ran into Dr. Harris there and talked to her about helping me do a professional development program the following year to work on implementing the science practices in our school.
So she agreed to that, and so we came back and I met…so after that NARST conference I met, separately, I tried to arrange a meeting together but wasn't able to, so I met separately with Dr. Harris and with Stuart to just discuss the ideas, and so by then the idea had shifted to rather than just only doing those monthly meetings to do a couple more intensive sessions.

15. Orientation: Planning departmental professional learning
And so, we would do one during postplanning this past year and then some follow-up sessions the following year.
And, originally the plan was to focus on those two things, argumentation and modeling,
and I had, at the NARST conference I had seen a presentation about this framework that integrates both of those together,

16. Complicating action: Refining and focusing the plan
but when I met with Dr. Harris she agreed that those two things would be, you know, new to teachers, and so, based on that, she suggested that we really should focus on one or the other of them rather than trying to do two things at one time.
So, I thought that was a good suggestion,
so we decided to focus on argumentation because it best addressed both the literacy standards and the science practices.
So then, I emailed, well emailed and met with our principal to bring all, you know, bring all this to him, and I had a really specific plan about we would have this daylong workshop during postplanning, and then we would have this follow-up workshop, and originally we were talking about like a two hour session in preplanning, and then we would meet monthly as originally planned and, and then we would do another longer session in preplanning for the following semester and then continue to meet throughout that second semester.
And, and he was on board with that plan, so we went ahead with it.

So, so I did, for that workshop, you know, I did a lot more background reading about argumentation and pulled together some resources.
And so, at the workshop we did, you know, I had a presentation to introduce the teachers to argumentation and what that means in science and how we can use it in the classroom.
And then, we did a model lesson that I led with the teachers,
and, and then we basically spent a lot of the day, Stuart brought in the new, the draft of the science standards,
and we had teachers looking at those, looking at the standards where it called for argumentation and explanation, and then, you know, thinking about lesson ideas for those.

17. Orientation: Facilitating professional learning
And the other main thing, the major thing we did that day was to, and I guess…I had gone in thinking, so I had gone in and set up like the main, kind of, tasks that we needed to do.
So, one was just introducing the teachers and then doing the model lesson.
And then, building on the idea of the coordinated lab report rubric, I wanted to have, you know, coordinated writing tasks throughout the grade levels that, you know, based on the argumentation framework, and so we needed to develop rubrics for that.
But then, we also needed to, you know, just do planning for the lessons in the classes.
And then we also, and I think, I don't remember if this, this wasn't, I didn't, I think this idea came from one of the teachers, specifically that we should have a, well no, it actually originally came from Dr. Harris that we should have a lesson, a common lesson that we would use to introduce to the students to this whole framework.
So, all the science teachers the first week of school would do a certain lesson, and she was going to help us, you know, kind of plan that, and it turned out that she wasn't there that, this first workshop.
And so, we just, I just gave the choice to the teachers, like here are these three or four major tasks that we need to do, so which one is most important and which one will help most in doing in this.
And one of the teachers was the leader in saying we should do the introductory lesson first and everybody agreed to that, because then we would have, we'd all work through one lesson plan together, and we'd have that set up.

18. Complicating action: Moving ahead from professional learning
So, we did that at that workshop, and then the other thing that came out of the workshop was that the teachers wanted more time in preplanning.

19. Resolution: Working with principal to continue plan
And so, I'm still in the middle of working with the principal now to do a full planning day before preplanning rather than just a two-hour session. So…

20. Evaluation:
It was well received, yeah.
And so, you know, I'm trying to, I know that the point is to talk about how I'm doing these things, so, I guess, what I've been trying to do, like I've taken a big role in directing what we're going to do, you know, it wasn't that we just, it kind of, it built on input from the department, you know, from those earlier meetings, I didn't just come up with it out of the blue,

21. Coda: Providing choice within a framework
but basically at that workshop, it was mainly here's, here's this area that we need to move into, and here's what it looks like in the classroom, and like I said here are these tasks that we need to do, so how, the choice for the teachers was how do we accomplish those tasks and how do we move forward, you know.

Kim Smits
Narrative 2: Implementing a District Literacy Initiative

1. Orientation: Participating in the school leadership team
Oh, I would say that instructional leadership is very important, at my school and I'm sure at the other schools.
That's really my main job is to be, kind of, the communications liaison in terms of helping the department share in the school common goals, having actions we're going to take to reach those goals.
So, I would say our leadership team at the school, in addition to just the department chairs, but the whole school leadership team is a group effort to reach those goals,
so one of the big focuses that we look is, you know, in my job, one of the jobs is to, within my department, look at data and how we can develop an action plan to improve in particular areas, whether that's in, you know, in biology on an EOCT test or for the Georgia high school graduation test or we've been focusing,

2. Abstract: Focusing on content literacy
for example, in the last year in reading comprehension and content literacy, that's their real big push, hoping that using content literacy would improve our scores on those gateway tests.

3. Orientation: Implementing district literacy initiative within the science department
Well initially, I was on the county literacy design team that,
a literacy foundation was working with our county, and so, as part of that team,
I went to workshops and trainings
and brought that back to the school with strategies,
not only for, you know, my department, but I'll just talk about my department,
and really started to focus on small reading and writing strategies within the department,
for example, some of them, some of our teachers used interactive notebooks
and I was there to facilitate and monitor progress with using interactive notebooks to get students writing in content areas more.
We also looked at some ways that we could help the English department with literacy that wasn't too burdensome to science teachers, you know we're not English teachers,
and trying to help the department overcome that fear of you can still teach literacy strategies and help these student become better readers and writers, even though you're not an English teacher.
Some of them, it's really, like with our ESOL kids within our department, it was shifting focus and finding things that we could have them read and respond to and,
you know, maybe within the upper level AP classes, we really delved into technical writing and laboratory reports and things like that.

Right, and then another teacher this year, was actually, we kind of passed the torch on and it became really a teacher within the department
and the teachers also developed modules for the foundation, the content literacy, there's like these entire modules that accomplish specific goals, I don't know how much she talked about what it takes to make these modules and put them together, and the department did work on that and did design modules,

4. Evaluation: Lasting impact of smaller strategies
but I think, for me, I think the department, when we discussed this, the more lasting impact was the smaller literacy strategies that came from those modules that they can use day-to-day even if they don't write the entire, you know, 12, 15 page module.

5. Orientation: Gaining teacher buy-in
Yeah, that was, there was a lot that I did to help teachers buy into it, like within the meetings, and since I was on it the year before it came back to school,

6. Complicating action/Evaluation: Piloting literacy strategies
I piloted things in my room,

7. Evaluation: Demonstrating strategies and benefits
so I could bring that to them and say, I know this sounds like a lot, because originally those modules were huge, they were very clunky to present to a teacher who is already busy and who is already overloaded that,
I knew that was going to be a real challenge,
and so, I kind of broke it down and took it apart and pulled some of the things
and was able to show them data of things, it really was effective, it did make a difference, from comments from students and, like I said, some data showing,

8. Complicating action/Evaluation: Piloting literacy strategies
for example, by doing those writing strategies with atomic theory, because I'm a chemistry teacher, I showed quite a bit of improvement by just getting the kids to write and re-write about some of these topics and learn to communicate better,

9. Evaluation: Managing teachers' perceptions of workload
so there was a lot within the department meetings, it wasn't easy, I'm not going to lie, it wasn't easy, because there was so much to those modules,

10. Resolution: Focusing on strategies rather than units
and so the way that I approached that was don't get caught up the, this whole big, you know, 12 to 20 page document and start looking at the little strategies and how it's going to help you.

11. Coda: Moving toward implementation
And some people are reluctant, you know, and still didn't really buy in, but I would say overall the last two years, teachers are using reading and writing more and starting to see the benefits, in the science classroom, which you wouldn't have seen before, you know.