

EXAMINING THE PATHWAYS AND SUPPORTS LEADING  
MSSE PROGRAM GRADUATES INTO  
LEADERSHIP ROLES

by

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## ABSTRACT

This study examined the pathways taken by science teachers to move into leadership roles, specifically teachers who had participated in and graduated from the Master of Science in Science Education (MSSE) program at Montana State University. Distributed teacher leadership has been identified as having the potential to improve schools, however, little is known about the pathways teachers take to move into leadership roles, how schools go about distributing leadership, or the supports that help teachers develop leadership skills. There is also a need to better determine how teacher leadership development and progression is supported through graduate programs.

This research was a two-level quantitative-qualitative research. The first level used a survey to explore the leadership roles teachers filled and the pathways teacher leaders took to move into leadership roles. The second level focused on creating case studies of eleven MSSE program graduates. Case study data was used to further examine and provide deeper insights into the pathways teachers used and the motivators or supports that encouraged them to move into or take on leadership roles. Case study data was also used to determine the extent to which participants perceived the MSSE program supported or contributed to their leadership development and progression. Specific supports provided by the program were identified.

The study provided evidence that the pathways taken by teachers tend to follow two main trends: teachers either volunteer in order to fill a void or address a need, or teachers are recruited by an administrator to fill a leadership role. The formality of the leadership role did not determine the formality of the pathway taken to move into the role. Conclusions include a descriptive framework for pathways taken to leadership and descriptions of specific supports provided by the MSSE program as identified by MSSE program graduates.

## CHAPTER 1 - INTRODUCTION

Science teacher leadership has been identified as a way to ensure that science reforms are met, new standards are implemented, and that best practices are used in the classroom. With the recent publication of the Next Generation Science standards, as well as the increase in accountability in education overall, schools need science teacher leaders who can rise to the challenge in reforming science education in the United States and around the world. The variety of roles teacher leaders can assume and the skills required to act as teacher leaders have been identified in the literature. However, questions remain regarding how science teacher leaders are best developed. This section will address recent trends in education reform, the need for shared leadership, the role of science teacher leaders in addressing current science education reform, and the potential of graduate programs in supporting the development of science teacher leadership.

### The Need for Teacher Leadership

In recent years, an increase in governmental and public pressure to improve the quality of education being provided in the United States has placed teachers under the pressures of managing standards, assessments, and learning needs while responding to demands for standardized assessments (Daly, 2009). Federal mandates, such as No Child Left Behind [NCLB], 2002), and its standard of adequate yearly progress (AYP), have brought about an era of increased teacher accountability accompanied by a focus on high stakes testing in English Language Arts, science, and math in K-12 education. This has resulted in a growing emphasis on reform and school improvement. While school

improvement efforts have been driven by the need to improve the quality of education being provided, many of these efforts have taken a performance-based approach (Massell et al., 1994), which measures student achievement through high-stakes assessments. Student performance on these assessments is used to determine how well students understand specific content standards, and student progress has been used to evaluate the quality of instruction provided. Without providing schools and school districts mechanisms for increasing accountability, however, a performance-based approach to reform lacks merit (Liethwood, Steinbach, & Jantzi, 2002).

Many government reforms that require increased accountability place the responsibility for leading reform on the school administration, primarily on school principals. This places added pressure on school administration already challenged with an increase in responsibilities. While principals have always had the ability to share responsibilities with and delegate tasks to teachers, the traditional model of top-down leadership utilized in schools has limited the amount of responsibility that principals feel comfortable giving to teachers. As Barth (2013) states, the need for principals to maintain control of what goes on in schools can limit leadership, as the principal feels ultimately responsible for the outcomes produced. When delegating a task or accepting a teacher's leadership of staff or curriculum development, responsibility for the outcome may still fall back on the principal, therefore encouraging principals to be cautious about relinquishing control (Barth, 2013).

However, due to the high pressures placed on schools by the accountability reform movement, school principals are no longer able to juggle all of these

responsibilities on their own. Distributed leadership, where principals and teachers share leadership responsibilities, became a response to the increased pressures brought about by the pre-NCLB reform movement (Hallinger & Heck, 1996). These reforms were fueled in the early 1980s by reports of poor student achievement in public schools and as accountability measures were introduced as a response to funding constraints (Hallinger & Heck, 1996). There is a great deal of value in being able to distribute responsibilities; English (2010) notes that it is foolhardy to put such high expectation and demands on so few leadership figures as one or two administrators. Therefore, English (2006) claims, it is necessary to further examine shared or distributed leadership roles:

Given the high levels of accountability and the increased focus on student achievement, it seems pertinent to more seriously examine the perspectives and actual work of teachers and school administrations who share leadership roles and tasks and the relationship of this work to the overall improvement of school programs. (p. 583)

The significance of including teacher leaders in the process of school reform is that relying upon teachers to act in a leadership capacity allows for specific responsibilities to be distributed. For example, teacher leaders may ensure that appropriate instructional reforms take place in classrooms and may also ensure that these reforms deepen the learning of all students (Ackerman & Mackenzie, 2006). Distributed leadership emphasizes the potential that collaboration between teachers and principals has for improving many aspects of how schools work.

Teacher leadership has repeatedly been identified as a viable way to reform schools (Darling-Hammond, 1997; Fullan, 1994; York-Barr & Duke, 2004). Teacher leaders make effective instructional leaders and agents of change for several reasons,

including but not limited to their knowledge about the community their school district serves, their ability to identify areas needed for improvement, and their ability to implement immediate changes in their classrooms.

Teacher leadership also plays a role in advancing science education goals for K-12 education. In order to meet the goals for science education outlined in the 1996 National Science Education Standards (National Research Council, 1996), it was stated that “science leaders must help practitioners to change their instructional strategies” (Yager, 2004, p. 23). As the Next Generation Science Standards (NGSS; NGSS Lead States, 2013) are adopted and implemented at the state level, teacher leadership is seen as a way to make the instructional changes purposed by the new standards possible. An expanded view of science teacher professional development incorporates a leadership component, which would give science teachers the tools to promote effective science teaching practices (Rhoton & McLean, 2008). Science teacher leaders can make an impact and aid science education reform by sharing resources with their colleagues, aid in the text book selection process, and assist in aligning curriculum to newly adopted state science standards.

In order for the challenges of the current reforms taking place in science education to be met, science teachers will need to incorporate leadership skills. A way to support science educators in the development of leadership skills is through teacher professional development programs that incorporate a leadership component. Participation in such programs would give science teachers the tools to promote effective science teaching practices (Rhoton & McLean, 2008).

### Problem Statement

Teacher leadership can have a positive impact on schools in many ways. There is a great deal of research indicating that teacher leadership can improve the quality of teaching, student learning, and the climate of a school (Darlington Hammond, 1997; Fullan, 1994; Larkin et al., 2009; Rhoton & McLean, 2008; Yager, 2004; York-Barr & Duke, 2004). While much is known about how science teacher leaders can impact schools, less is known about how science teachers develop leadership skills. Much of the research focuses on experienced teachers (Ackerman & Mackenzie, 2006; Nolan & Palazzolo, 2010), supporting the perception that leadership skills are developed over years of experience. This raises the question as to whether science teacher leadership skills can be developed and supported in teachers of varying levels of experience through forms of professional development.

This study focused on questions that were raised in the research regarding teacher leadership. York-Barr (2004) suggested identifying the paths by which teachers act as leaders and how they lead, formally or informally, as areas for further research. The clarification of the models, approaches, and forms of teacher leadership in practice was also cited as an area further research (Harris & Mujsis, 2004). Identifying how teacher leadership can best be facilitated and developed in the context of a specific professional development was also posed by Harris and Mujsis (2004). The questions posed were investigated by examining how graduates from a specific science professional program, the Master of Science in Science Education (MSSE) program, a program that does not specifically focus on developing teacher leadership, moved into positions of leadership,

identifying potential supports that encouraged participants to take on leadership roles, and examining the extent to which program graduates felt the MSSE program contributed to the development and progression of their teacher leadership.

### Purpose Statement

The objective of this study was to identify how MSSE program graduates move into roles of leadership, examine the pathways taken in order to transition into roles of leadership, and to determine what roles and supports the MSSE program provided that contributed to the development of science teacher leadership skills and/or the progression of leadership involvement.

### Research Questions

The central research question was: How do MSSE graduates move into roles of teacher leadership?

The sub-questions were:

1. What pathways do teachers take in moving into roles of leadership?
  - 1a. Were educators assigned a role, recruited, or self-motivated?
  - 1b. What other motivations were involved?
2. How do MSSE program graduates demonstrate progression in their involvement in leadership?
3. How do MSSE program graduates perceive that the MSSE program contributed to a progression in their leadership involvement and/or development?

3a. What specific supports did the program provide?

3b. Is there a relationship between MSSE program graduates' perception of the extent to which specific factors encouraged them to take on leadership roles and the extent to which they perceived the MSSE program supported the development of these factors?

This study focused on science teachers who had participated in the Master of Science in Science Education (MSSE) program, an educational Master's program for science educators offered through Montana State University Bozeman. The MSSE program aims to "provide an exemplary, accessible, responsive, and student-centered applied science education Master's degree resulting in teaching and learning of science for educators and their students" ("About Us," n.d., para. 1). Participants of the program include K-14 classroom teachers across the United States as well as some individuals residing in other countries. The program also serves science educators working in informal educational settings such as zoos, nature programs, and extension offices.

This study used a two level quantitative-qualitative mixed methods design (Gay & Airasian, 2000). Level one utilized a survey and level two utilized a review of documents and case study interviews to investigate leadership skill development from MSSE program participants who had graduated within the past seven years.

### Significance of the Study

Teacher leadership has been identified as a viable way to reform schools (Darling-Hammond, 1997; Fullan, 1994; York-Barr & Duke, 2004). Teacher leaders have the potential to influence the culture of the school and these positive efforts could promote productive school culture. Cultivating a sense of community or culture in schools is a key to school success. The significance of the study is that it identified potential pathways science teachers take in moving into roles of leadership, explored the extent to which the MSSE program supports science teachers in progressing as teacher leaders, and identified specific components that triggered or supported individual cases of progression in leadership. These findings aimed to fill in gaps identified in the literature regarding how teacher leadership is developed and enhanced (Harris & Mujis, 2004; Harris & Spillane, 2008) and what paths are taken by educators as they move into leadership roles.

Identifying how science educators move into roles of leadership and what components act as supports in their development as leaders provides science teacher leaders with important information to transform schools. School administrators, those involved in pre- and in-service teacher education, and those involved in education reform would greatly benefit from this information, as once specific details regarding how teacher leaders move into roles of leadership have been identified, similar techniques and strategies could be implemented to improve other science education pre-service and in-service programs.

## Limitations

### Survey Limitations

One limitation of the study is that it relied on program graduates to respond to a survey. This may have been an inconvenient task for participants, which may have reduced the number of participants, potentially resulting in a biased sample. Graduates who chose to participate in the survey may have had a higher interest in teacher leadership than those who did not participate, thus, may have been more likely to act as teacher leaders than those who did not participate. A second limitation of the study is the manner in which the instruments were used to collect data. Educators were provided with a self-assessment survey, and while care was taken to ensure that educators were instructed on how to use the survey, it is still possible that participants relying on their own perceptions may have elicited responses that over or underestimated a true representation of their leadership abilities. Using a survey to gather data also may have limited the depth of the answers to some of the questions asked, as the survey may have allowed participants to provide answers to posed questions without providing an opportunity to explain the reasoning to their answer.

### Case Study Limitations

One limitation of the case studies is that case study participants were selected from a pool of survey participants who had volunteered to be further involved in the study. Individuals that volunteered to be involved may have displayed higher levels of

interest and involvement in teacher leadership than those who chose not to volunteer, thus producing results that are not truly representative of the entire population.

A second limitation of this study relates to the timeline of the completion of the study. Case studies typically involve engagement with case study participants over a length of time. The timeframe in which the researcher reviewed documents and conducted interviews was condensed. A long-term case study in relation to examining teacher pathways, leadership progression, and the perceived impact of the MSSE program may provide additional insight.

### Delimitations

This study focused specifically on graduates of the MSSE program, an interdisciplinary graduate program for science educators. The definition of leadership used for this study focused on leadership skills that would be utilized by science teachers, and was not concerned with forms of leadership that focus specifically on administrative roles, budgeting, et cetera. Students who had graduated from the MSSE program within the past seven years were included in the population from which the sample was drawn.

### Survey Delimitations

The survey portion of the study sought to determine the pathway these graduates had taken to become teacher leaders, to determine whether there was a perceived relationship between the MSSE program and the development of specific leadership components, and served as a means from which the case study participants were selected. The results of the survey portion of the study are generalizable to other science education

graduate programs similar to the MSSE program from which the educators who served as the sample were selected.

### Case Study Delimitations

The case studies sought to provide insight on how teacher leaders move into roles of leadership and to better describe the pathways taken and the processes involved. The case studies also sought to examine MSSE program graduates' perception regarding their teacher leadership development and progression and to examine the extent to which they felt the MSSE program played a role. Eleven MSSE program graduates participated in the case study portion of this study. Each individual case is bounded by the grade level, type of school, and general location of the school. Information that reflects the boundaries of each case is shown below in Table 1. Names have been changed to protect the identity of the case study participants.

Table 1  
*Case Study Participants*

Name	Geographic Location	Grades Taught	Size and Type of School	Descriptive School Information	Leadership Role
Ms. Ackerman	Rocky Mountain West	6-8	Mid-sized Public	Metro area	PLC, Curriculum team
Ms. Jessen	Mid-Atlantic	11-2	Large Public	Located in a suburb near major metro area, has a strong IB program	Instructional and assessment coach

Table 1 Continued

Ms. Akin	Midwest	4-5	Large Public	Urban, large African American student population	PLT, science lead, STEM fair
Mr. Tollefson	Rocky Mountain West	6-8	Mid-sized Public	Located in a college town	Mentor, Curriculum
Ms. Hoffer	Rocky Mountain West	9-12	Large Public	Located in a suburb near large metro area	PLC, Professional development
Mr. Semmler	Caribbean Island	9-12	Small Private	Uses UK National Curriculum	Data Management Coordinator
Mr. Dirksen	Pacific North West	k-5	Mid-sized Public	High population of Hispanic, ELL students, high poverty rate	Instructional Coach
Ms. Stahl	Rocky Mountain West	6-8	Mid-sized Public	Located in College town, motivated student body, high socio-economic status	NGSS , Grading Committee, Resource Team
Mr. Nowell	Rocky Mountain West	9-12	Small Private	Strong outdoor and summer programs	Developed Curriculum

Table 1 Continued

Ms. Minske	Atlantic South East	University	Public University	Serve students coming from generational poverty	Inquiry Labs
Mr. Marshall	Pacific West	9-12	Large Public	Diverse student body, 30% Hispanic	School Cluster, Mentor

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All of the individuals who participated in the case study portion continued to display involvement in education, and while some of the individuals were no longer in a classroom teaching position, they were in a role that supported classroom teaching. This study did not examine teacher leadership as pertains to individuals serving in administrator or principal roles.

### Summary

As school improvement and the quality of education provided by K-14 schools continue to be concerns, teacher leadership, specifically the ability of teachers to initiate positive change within their schools in a way that extends past the boundaries of their own classroom, is viewed as a valuable tool in school improvement. While it is well supported that teacher leadership can have a positive impact on schools and is a potential method of school reform, it is more challenging to identify how science teachers develop these leadership skills. It should be noted that there has been an increase in the number of professional development programs that focus on developing educational leadership, however, few of these programs are designed to provide classroom teachers with the tools

needed to take on leadership roles. On the contrary, many of the programs that focus on educational leadership serve to prepare educators who wish to become administrators. Although the MSSE program does not inherently have a leadership focus, this researcher felt the program included many components identified in the literature as supporting leadership development. The goal of this study was to identify the following: the pathways science teachers take to move into roles of leadership, the supports or motivators that encourage science educators to a move into leadership roles, and the role the MSSE program has in supporting the development of science teacher leaders.

## CHAPTER TWO – LITERATURE REVIEW

Schools have been challenged to respond to and to address the changes proposed by recent reforms. Teacher leadership has the potential to play an important role in implementing reforms at the school level as a means to distribute leadership. In science education, science teacher leaders will play a big role in successfully implementing the reforms required by the NGSS. This chapter will present a brief history of how science teaching has been reformed over the past 60 years, examine teacher leadership as a means for science education reform, provide a working definition of teacher leadership, and identify leadership skills. Leadership development, programs that focus on the development of teacher leaders, and the conceptual framework that guides this research will also be discussed.

### Reform of Science Teaching

This section will discuss the history of science education reform, the National Science Education Standards (NSES), and the Next Generation Science Standards (NGSS). The ability of teacher leadership to assist in the reform of science education reform will also be discussed.

### History of Reform

Science education has been a continued focus of nationwide reform for the last few decades, with the first efforts starting in the 1950s in response to the Soviet space program (Yager, 2000). The focus of these reforms was to develop science curricula that

would produce a nation of individuals who had an understanding of and appreciation for science (Yager, 2000). Although the science education reforms of the 1950s focused on teaching science as inquiry, the instructional methods used in schools focused on the use of textbooks to deliver the content (Yager, 2000). These reform efforts faded by the late 1970s due to a lack of public support for school science and even a tendency to blame science for political, societal, and environmental crises of the times (Yager, 2000).

The National Science Foundation (NSF) decided that before implementing any further reforms, further research and evidence was needed, and thus funded the Project Synthesis to research goals for science education (Shamos, 1995). The Project Synthesis identified four major goals for science education: personal needs, societal issues, career awareness, and academic preparation. In the final report for the Project Synthesis, Harms and Yager (1981) proposed shifting goals, programs, and practices in science education from an emphasis on academic preparation for science careers for a few students to an emphasis on preparing all students to grapple with science and technology as seen in their daily lives and to participate in the science-related decisions that our country will have to make.

These views, while valid, were put somewhat on hold in 1983, due to economic instability caused by perceived supremacy of Japan, Germany, and other nations over the United States. In response to this, the National Research Council (NRC) made funds available to study how humans learn. This change in focus initiated the movement of cognitive science (Yager, 2000). This shift in direction had a big impact on education reform and science education reform, as the focus moved from identifying how to teach

science content to examining how students learn and make sense of science. The study of cognitive science continues to offer guidance in educational decision making and reform (Yager, 2000).

In 1996, after four years of work, the NRC published the Science Education Standards with the goal to increase science literacy nationwide. The standards were organized around four goals that held some similarity to the goals put forth by Project Synthesis. The goals were:

- students experience richness and excitement in knowing about and understanding the natural world;
- use appropriate science processes in making decisions;
- engage intelligently in debate regarding matters of science and technological concern;
- and increase economic productivity through the use of knowledge.

These national standards also focused on changes teachers would have to make in their instructional approach, and were developed with an emphasis on students learning science as a process, in which student learning focused on using skills such as observing, inferring, and experimenting (NRC, 1996). The National Science Education Standards also focused on teaching inquiry as a process in order to allow students to actively develop their understanding of science by combining scientific knowledge with reasoning and thinking skills (NRC, 1996). These changes were an appropriate response to the earlier reform efforts, as they moved the concentration in science instructional methods

away from a textbook-driven focus and placed emphasis on providing students with opportunities to learn and develop their own science process skills.

The 1996 National Science Education Standards made a great deal of progress in the manner in which science was taught, as the standards strongly recommended instructional practices that focused on process-driven science instruction. However, later standards revisions were suggested in order to reduce the overwhelming amount of science content and to allow for a focus on key concepts in depth (Bybee, 2006). The most recent revision of national science standards, the Next Generation Science Standards, published in 2013 (NGSS Lead States), reflect a reduction in the amount of science content that is to be covered and an increase in the depth of student understanding that is to be achieved. The NGSS also added engineering standards, which had not been previously addressed in science and will pose a challenge to science teachers as the standards are adopted and implemented.

School districts have the responsibility for implementing the new science standards. Thus it falls on science educators to adjust their science curriculum in order to adapt to the changes laid out by the NGSS. Science teacher leaders will play a big role in implementing Next Generation Science Standards (NGSS) at the state, district, and school levels.

### Teacher Leadership as a Means for Reform

With the publication and implementation of the Next Generation Science Standards, the importance of and need for science teacher leaders is more apparent than ever. Previous science education reform efforts, as well as accountability-based school

improvement efforts like No Child Left Behind (NCLB), have placed a great deal of responsibility on school administration, primarily school principals. In response to the reforms and school improvement efforts, teacher leadership has been acknowledged as a means to reduce some of the many pressures placed on the school principal.

Through distributed leadership, principals are able to rely upon teachers to act in leadership capacities, reducing the individual responsibilities of the principal and spreading responsibilities among teacher leaders (Hallinger & Heck, 1996; Harris, 2004). English (2006) supports the claim that moving to share or distribute the leadership between the school principal and teachers is a promising means for improving the quality of schools. He describes three progressive waves the teacher leadership movement has gone through. The first wave focused on management, effectiveness, and efficiency of the school system; the second focused on instructional abilities and capacity to inform instructional improvement; and the third wave focused on designing schools, mentoring colleagues, and engaging in problem solving. While the first wave placed the majority of the leadership responsibilities on school administration and building principals, the second and third waves moved to an emphasis on using teacher leadership as a means of school reform. The views put forth by Hallinger and Heck (1996), Harris (2004), and English (2006) regarding the potential benefits of increased teacher leadership are based upon the distributed leadership theory, which will be further discussed in the conceptual framework section of this chapter.

### Ways Teacher Leadership Can Drive Reform

Teacher leadership has been identified as having the potential to positively impact the quality of instruction, student learning, and improve the climate of a school (Darling-Hammond, 1997; Fullan, 1994; Larkin et al., 2009; Rhoton & McClean, 2008; Yager, 2004; York-Barr & Duke, 2004). Kurtz (2009) states that teacher leaders make effective instructional leaders and agents of change for several reasons:

They care about what they do, how they do it, and how it affects student learning. They also remember the results of trials and errors of previous times, know the community their school district serves, and understand its values and attitudes. They can implement real change by returning to their classrooms and making it happen. (p.12)

In light of the NGSS, it is important to consider how science teacher leaders may have an impact in implementing the standards and adapting science curricula to the changes in content coverage these standards prescribe. Kurtz (2009) states that strong teacher leaders share three categories of action: they reveal to others new ways of doing things, they aspire for the best in themselves and their colleagues, and they help others solve problems. These categories of action, if taken by science teacher leaders, have the potential to assist science teachers in successfully implementing NGSS, adapting their science curriculum, and aiding other science educators in the processes as well. Ackerman and Mackenzie (2006) support this view, stating that teacher leaders continually think about the gap between the reality and what is ideal in schools, witness discrepancies, challenge the status quo, and derive authority from classroom experience. Teacher leaders may aid in school improvement efforts by ensuring that instructional reforms take place in the classroom and implementing changes that deepen the learning

of all students (Ackerman & Mackenzie). This view of teacher leadership supports the notion that science teacher leaders will play an important role in the implementation of the NGSS at the district level.

Teacher leadership is also supported by national associations as a means for education reform. The National Science Teacher Association (NSTA), a professional association for science teachers, publicly declares responsibilities that science education leaders have in implementing science education reform, ensuring quality science instruction, and implementing science curriculum. The NSTA makes the following declarations regarding the role of science education leaders and their role in implementing science reform:

Science leaders must cultivate a leadership network consisting of principals, lead teachers, science department heads, and community leaders to implement science education reform at all levels of the school system. Furthermore, local superintendents, local school boards, and chief state school officers must work closely with science leaders as they move forward with science education reform. (NSTA, 2003, "Leadership in science," para. 3)

Using the NSES as a framework, the NSTA additionally holds the following position that in the area of science teaching and learning, science leaders must:

- ensure that scientific inquiry and the development of science process skills are essential components of instruction;
- encourage the use of a variety of teaching styles that emphasize constructivist approaches, including differentiated instruction and cooperative learning;
- encourage the use of student self-assessment in the classroom;
- communicate progress in student learning to parents and students;

- build principals' capacities to recognize standard-based science instruction and to provide instructional leadership in science. (NSTA, 2003, "Leadership in science," para. 3)

NSTA's position on science teaching and learning supports the view that science teacher leaders can drive science education reform. A focus on instructional methods, discussed as a needed reform from the early reforms of the 1950s, is still considered an important way to improve science education. There has been an ongoing discussion regarding moving from textbook driven instruction to inquiry based methods since the reforms of the 1950s, but the implementation of these instructional practices requires science teacher leaders to assist educators who are less comfortable with using these instructional methods. The implementation of the NGSS will bring this issue to forefront, as the new standards aim to focus on fewer science concepts in order to provide students with opportunities to delve deeper and develop a more in-depth understanding of the science concepts covered by the standards. Science teacher leaders potentially have a large role to play in ensuring that the content standards are implemented and that the best instructional methods are utilized in science classrooms to ensure that students not only learn the science content, but can demonstrate their understanding through analysis, application, critical thinking, and constructing explanations in order to meet the expectations set forth by the NGSS.

The NSTA also supports the notion that science teacher leaders can aid in reforming science education by developing standards-based science curricula, as demonstrated in the NSTA position statement regarding science curriculum.

In the area of science curriculum, science leaders must:

- develop and align curriculum, assessment, and instruction with national and state standards while meeting local needs;
- ensure the development and selection of science curriculum that is pedagogically appropriate and encompasses strategies for building conceptual understanding;
- ensure the development and selection of standards-based science curriculum that infuses inquiry, promotes scientific concepts and processes, and integrates content to ensure understanding in earth and space sciences, biology, chemistry, and physics. (NSTA, 2003, “Leadership in science,” para. 3)

The tasks and roles that science leaders are encouraged by the NSTA to fulfill require a great deal of science content knowledge and science teaching pedagogy knowledge as well as experience utilizing inquiry-based science instruction and data to drive instructional decisions (NSTA, 2003, “Leadership in science,” para. 3).

### Summary

This section presented a history of science education reform, and presented the current focus of science curriculum and instruction, which has changed to include more inquiry and science process skills. This section also discussed the ways that science teachers could serve in science teacher leadership roles, including working to implement new standards, select instructional materials, help other science teachers, and develop science curriculum and assessments.

### Defining Teacher Leadership and Identifying Leadership Skills and Roles

Considering the many ways in which teacher leaders can impact schools, and more specifically, science instruction, it is helpful to define what teacher leadership is and to identify what teacher leaders do. This section will discuss how teacher leadership has been defined, the skills that have been identified as contributing to teacher leadership, and the different roles that have been identified as leadership roles.

#### Teacher Leadership Defined

The definition of teacher leadership remains varied because teacher leadership encompasses a wide range of roles that teachers can assume and activities they can take part in. However, most definitions of teacher leadership “hold in common an expanded view of teachers’ contribution to schooling through leadership activities and efforts beyond the boundaries of the classroom” (English, 2006, p. 583). Katzenmeyer and Moller (2001) define leadership as those who lead within and beyond the classroom, identify with and contribute to a community of teachers, and influence others towards improved educational practice. The definition of teacher leadership provided by Katzenmeyer and Moller (2001) is the view of leadership used in the present study, in that it focused on teacher leaders as individuals who influence and assist other educators while remaining in a teaching role themselves.

Considering that teacher leadership in itself has multiple definitions and sub-categories, it can be challenging to distinguish the difference between the characteristics and skills needed to be a leader, and the actual roles leaders take on. Many definitions of

leadership focus on the skills that are required in order for teachers to make a contribution within their schools, whereas the descriptions of leadership roles often identify specific tasks that teachers attend to in order to contribute. The skills and characteristics that teacher leaders must possess and a variety of the potential roles that teacher leaders assume will be discussed next to provide some clarity between the two topics.

### Characteristics of Teacher Leaders

The literature cites a multitude of characteristics or skills that teacher leaders are to possess. These skills include: serving beyond the classroom, having expertise, and being reflective. Each will be described in turn.

Leaders Serve beyond the Classroom. A characteristic of teacher leaders is that they make an impact beyond the walls of their own classrooms (Hunzicker, 2010; Northern & Bailey, 1991). The ability to communicate with colleagues is an important skill in achieving this goal (Hunzicker, 2010; Leithwood, 2001; Northern & Bailey, 2010). In addition to communicating, fostering a positive school climate and being open to change also enables teacher leaders to support the greater school environment (Northern & Bailey, 1991). Sharing resources with colleagues (Leithwood, 2001) and aiding others in decision making (Hunzicker, 2010) further extend teacher leaders' impact in and beyond their schools.

Leaders Have Expertise. In order for teacher leaders to make an impact beyond the classroom, they must possess a great deal of content and pedagogical knowledge.

Teachers must have a mastery of content knowledge (Leithwood, 2001), and expertise and experiences in teaching pedagogy (Nolan & Palazzolo, 2010).

Leaders Are Reflective. Teacher leaders have the ability to reform schools because they seek to make changes. These changes are determined through reflection upon and identification of areas in need of improvement. Teacher leaders are viewed as reflective and experienced practitioners (Ackerman & Mackenzie, 2006), who have tested their beliefs and philosophies about teaching and learning, and continue to question the extent to which their teaching practices align with their philosophies (Northern & Bailey, 1991).

### Leadership Roles

It can be challenging to define the roles of teacher leaders, as teachers are not homogenous in the roles they take on nor in the ways they view themselves acting as leaders (English, 2006). There are many ways in which teachers can act as leaders, as described in Table 2. This table provides several dimensions of leadership practice and related examples of teacher leadership roles that fall under each dimension, as provided by the literature. The dimensions included are coordination or management, curriculum work, professional development of colleagues, participation in school change or improvement, parent and community involvement, contributions to the profession, and pre-service teacher education.

Teacher leaders can take on a variety of roles under these dimensions, including mentoring novice teachers, sharing curriculum, sharing technological expertise, and

leading decision making that affects the school. Teacher leaders may help their colleagues by sharing instructional resources, including websites, instructional materials, teaching strategies, readings or other resources to use with students. They might also participate in school improvement efforts or professional development efforts. The leadership roles taken on may look different for individual educators, as the needs of each school are unique.

Table 2  
*What Do Teacher Leaders Do?*

Dimension of practice	Examples of supporting literature
Coordination, management	<ul style="list-style-type: none"> <li>• Coordinating daily schedules and special events (Wasley, 1991a)</li> <li>• Participating in administrative meetings and tasks (Smylie &amp; Denny, 1990a)</li> <li>• Monitoring improvement efforts; handling disturbances (Heller &amp; Firestone, 1995a)</li> </ul>
School or district curriculum work	<ul style="list-style-type: none"> <li>• Defining outcomes and standards (Paulu &amp; Winters, 1998a)</li> <li>• Selecting and developing curriculum (Darling-Hammond et al., 1995a; Fessler &amp; Ungaretti, 1994)</li> </ul>
Professional development of colleagues	<ul style="list-style-type: none"> <li>• Mentoring other teachers (Archer, 2001; Berry &amp; Ginsberg, 1990; Darling-Hammond et al., 1995a; Devaney, 1987a; Fessler &amp; Ungaretti, 1994; Hart, 1995; Paulu &amp; Winters, 1998a)</li> <li>• Leading workshops (Devaney, 1987a; Fessler &amp; Ungaretti, 1994)</li> <li>• Engaging in peer coaching (Berry &amp; Ginsberg, 1990; Devaney, 1987a; Fessler &amp; Ungaretti, 1994; Guiney, 2001)</li> <li>• Modeling, encouraging professional growth (Silva et al., 2000a; Smylie &amp; Denny, 1990a)</li> </ul>
Participation in school change/ Improvement	<ul style="list-style-type: none"> <li>• Taking part in school-wide decisions (Berry &amp; Ginsberg, 1990; Hart, 1995; Paulu &amp; Winters, 1998a)</li> <li>• Working with peers for school change (Darling-Hammond et al., 1995a; Heller &amp; Firestone, 1995a; Silva et al., 2000a)</li> <li>• Facilitating communities of teacher learning through organization-wide processes (Crowther et al., 2002a)</li> <li>• Participating in research, notably action research (Henson, 1996a)</li> <li>• Confronting barriers and challenging the status quo in the school's culture and structures (Crowther et al., 2002a; Silva et al., 2000a)</li> </ul>
Parent and community involvement	<ul style="list-style-type: none"> <li>• Becoming involved with parents; encouraging parent participation (Paulu &amp; Winters, 1998a)</li> </ul>

Table 2 Continued

-	<ul style="list-style-type: none"> <li>• Creating partnerships with community businesses (Paulu &amp; Winters, 1998a)</li> <li>• Working with the community and community organizations (Crowther et al., 2002a; Paulu &amp; Winters, 1998a)</li> </ul>
Contributions to the Profession	<ul style="list-style-type: none"> <li>• Participating in professional organizations (Fessler &amp; Ungaretti, 1994; Paulu &amp; Winters, 1998a)</li> <li>• Becoming politically involved (Paulu &amp; Winters, 1998a)</li> </ul>
Pre-service teacher Education	<ul style="list-style-type: none"> <li>• Building partnerships with colleges and universities to prepare future teachers (Darling-Hammond et al., 1995a; Fessler &amp; Ungaretti, 1994; Paulu &amp; Winters, 1998a; Sherrill, 1999)</li> </ul>

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*Note.* Adapted from *Review of Educational Research*, p. 266, by J. York-Barr and K. Duke, 2004.

While some leadership roles are assigned and informal, others are taken on informally (Barth, 2001). Formal leadership roles include serving as a lead teacher, department head, union representative, mentor teacher, or teacher coach. An instructional specialist or teacher coach may help colleagues implement effective teaching strategies such as utilizing differentiated instruction or team teaching. Instructional specialists can also support classroom teachers through sharing their knowledge of research-based classroom strategies and instructional methodologies (Harrison & Killion, 2007). Informal leadership roles may include participating in curriculum development, developing standards for student behavior, assisting with student placement, contributing to staff development, encouraging new initiatives, and informally mentoring new teachers (English, 2006). As noted by Harrison and Killion (2007), teacher leaders assume a wide range of roles in order to support school and student success. Regardless of whether these roles are assigned formally or adopted informally, the consensus is that teacher leaders take an active role to make changes and

improvements in some aspect within their schools. These leadership roles can also be applied to science teachers, in their efforts to carry out science education reform.

### Summary

Teachers can lead in a variety of ways and can contribute to supporting both school and science education reform. Teacher leadership roles can be classified as formal or informal roles, and the opportunities in which teachers can act in a leadership role are numerous and varied. Teachers can take on leadership roles that fall under coordination or management, curriculum work, professional development of colleagues, school improvement efforts, parent involvement, contributing to professional organizations, and aiding in pre-service teacher education (York-Barr & Duke, 2004). Based on the multitude of leadership roles and the impact of distributed leadership in schools, teacher leadership has great potential to improve many facets of school operations.

Teacher leaders, regardless of the roles they assume, have the ability to initiate change in their schools and have been acknowledged as playing an important role in school and science education reform. Because teacher leadership has the potential to make such a positive impact on schools and on science education reform, it is necessary to examine how teachers develop the skills that contribute to teacher leadership.

### Components That Contribute to Leadership Development

Specific components that contribute to the development of leadership have been identified through an examination of teacher leadership programs. In order to show that these components are valid, and not only the result of data collected through program

participants' self-reporting, a review of the literature identified twenty studies related to factors that facilitate and aid in leadership development, as presented in Table 3 and further discussed in this section.

Table 3  
*Factors That Facilitate and Aid in Leadership Development*

Factor	Reference
Action research, use data to inform decisions	Hunzicker, 2012; Katzenmeyer & Moller, 2001; Sagor, 2000; Taylor et al., 2011; Thomas, 2011
Collaboration and social interaction	Blasé & Blasé, 2006; Darling-Hammond & McLaughlin, 1995; Ecans, 2014; Katzenmeyer & Moller, 2001; Lieberman & Friedrich, 2007; Murphy, 2007; Seashore-Louis et al., 1996; Thomas, 2011, Wenger, 1998
Exposure to research based practices	Hunzicker, 2012
Opportunities to reflect	Sagor, 2000; Snell & Swanson, 2000; Thomas, 2011
Increase self-confidence & self-efficacy	Harris & Muijs, Hunzicker, 2012
Increase content knowledge	Fullan, 1995; Hunzicker, 2012; Rhoton & Mclean, 2008; Snell & Swanson, 2000; Yager, 2008

Table 3 Continued

Increase pedagogical knowledge	Darling-Hammond & McLaughlin, 1995; Snell & Swanson, 2000
Clear vision and definition of teacher leadership	Hanuscin, Rebello, Sinha & 2002; Zinn, 1997; Wasley, 1991

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Critical Reflection and Problem Solving

Thomas (2011) cites the importance of using critical reflection in the growth and development of an individual's teaching practice. Critical reflection is the practice of analyzing and reflecting upon the effectiveness of one's teaching practices. This practice contributes to teacher effectiveness and improvement; however, it is a component that teacher education programs for pre-service teachers often lack. Teachers typically read about how to incorporate teaching methods, classroom management strategies, and assessment tools into their teaching practice, but are not provided with the chance to implement and critically reflect upon the effectiveness of such techniques in their own classrooms (Thomas, 2011). However, professional development that focuses on action research provides teachers with opportunities to incorporate these techniques while providing teachers with an opportunity to reflect upon which practices are effective.

Action research is the practice in which educators research how their teaching practices affect their students. Action research allows teachers to reflect upon and evaluate their teaching practices, as well as how these practices impact student learning. "Teacher leaders will grow and develop both personally and professionally through

action research. Evaluating and reflecting on one's teaching in a systematic way will result in more effective teaching, and in the end, higher achievement by students" (Thomas, 2011). In the age of teacher accountability, educators are faced with increasing pressure to make decisions based on both evidence-based practices and data. Teachers who engage in action research develop new skills necessary to reflect on and evaluate their students' learning based on data collected. While the main purpose of classroom-based action research is to develop change in the teacher's classroom, designing and carrying out an action research project supports teachers in becoming reflective practitioners (Sagor, 2000).

By becoming a reflective teacher and carrying out inquiry-based projects, a teacher provides himself or herself with the opportunity for improvement year after year. Action research is cyclical, with the new knowledge that results from research often leading the researcher into new directions. Hunzicker also (2012) supported the incorporation of action research into programs aiming to develop teacher leaders. Teachers who participated in a Science, Technology, Engineering, and Math (STEM) masters program reported that "they learned the most, however, through the action research projects" that were required for the program (Hunzicker, 2012, p. 274). Conducting action research helped the teachers determine which instructional techniques were successful and helped them to use data to inform their instructional decisions, which helped teachers increase their self- efficacy.

Hunzicker (2012) identified three interrelated practices that aid in the development of leadership skills that can be linked back to engaging in action research:

(a) exposure to research based practices, (b) increased efficacy, and (c) serving beyond the classroom. Educators who have been exposed to research-based practices are better able to incorporate these practices into their own instruction. Educators involved in the STEM master's degree program acknowledged an increased self-efficacy as they became more familiar with research based practices. The literature often cited action research as a means to develop educators' self-efficacy, provide opportunities for reflection, develop the skills needed to collect and use data to drive decisions, and apply research-based educational practices (Hunzicker, 2012; Sagor, 2000; Taylor et al., 2011; & Thomas, 2011). Educators were able to serve beyond their classroom through engaging in professional inquiry, including conducting action research. This helped educators become more comfortable in using data to inform their instructional decisions. "Teachers increased their self-efficacy by employing student-centered instructional approaches (Hunzicker, 2012, p. 276)."

### Increased Content and Pedagogical Knowledge

A second component identified in the literature as contributing to the development of teacher leadership was content and pedagogical knowledge (Hunzicker, 2012; NSF, 2010; Rhoton & McLean, 2008; & Yager, 2004). Content knowledge is having a deep understanding of the concepts specific to the subject matter the educator is responsible for teaching. Pedagogical knowledge is having an understanding about how individuals best learn and knowing what teaching strategies to employ. Considering the wide variety of roles that teacher leaders assume, it is logical that an increase in pedagogical knowledge would help teachers feel confident acting as mentor teacher or

instructional coach. Teachers involved in the Science, Technology, Engineering, and Math (STEM) master's degree program indicated that they were more confident in acting in leadership roles as they felt their involvement in the STEM Master's program increased their content knowledge in science and mathematics (Hunzicker, 2012). An individual teacher involved in the study stated "By broadening my content knowledge, I am able to provide deeper learning opportunities to my students. I am also able to fill a leadership role with my colleagues by providing resources in the areas of math and science" (Hunzicker, 2012, p. 274). Snell and Swanson (2000) also provided support for increasing content knowledge as a means to develop teacher leadership. In their study of ten middle school teachers, the authors noted that teachers emerged as leaders if they developed high level skills in the areas of expertise. These areas included developing strong pedagogical and subject knowledge, and the ability to collaborate and reflect on their own practice as well as their ability to empower themselves and others. Germuth (2012), in the assessment of the BrainSmart programs, also indicated the impact improved pedagogical knowledge can have on teacher leadership. As teachers in the program increased their knowledge, they felt more confident and more willing to share this knowledge with their colleagues.

### Collaboration

A third component cited in the literature that contributes to the development of teacher leadership is the ability to engage in dialogue and collaboration (Blasé & Blasé, 2006; Ecans, 2014; Lieberman & Friedrich, 2007; Thomas, 2011; & Wenger, 1998).

Collaboration in education is viewed as sharing and working with one's colleagues.

Thomas (2011) suggested that professional development that is focused on developing teacher leadership should emphasize the inclusion of activities that provide opportunities for teachers to have dialogue and collaborate with one another. Dialogue and collaboration can be incorporated through engagement in professional learning communities. These professional learning communities can be a powerful means to promote and facilitate professional learning and development (Ecans, 2014). Lieberman and Friedrich (2007) also mentioned the importance of social interaction and collaboration. Teachers, through the processes of engaging in collaboration, observe and practice leadership as they recognize colleagues' areas of expertise, build trusting relationships, and engage in problem solving and task completion (Lieberman & Friedrich, 2007). Wenger (1998) also supported the use of collaboration, proposing that collaboration within a community of practice helps teachers to develop a shared repertoire of practical tools, conceptual learning, and ways of thinking about problems that enable them to move beyond knowing about practice to implementation. There is also evidence that consultation with peers has the potential to enhance both teachers' self-efficacy as it allows educators to reflect on instructional practices, and teachers' ability to improve through collaboration (Blase & Blasé, 2006).

#### Clear Definition of Leadership

Hanuscin, Rebello, and Sinha (2002) conducted a research study in which the definitions of teacher leadership, past leadership experiences, and teachers' views of themselves as leaders were examined in order to better identify and address areas of growth for teacher leaders. Results from their study indicated that there was a

discrepancy between how leadership is defined in the literature and how leadership is defined by teachers themselves. Teachers' definitions of leadership contained elements that fell into two major categories: personal qualities and the knowledge and skills of leadership (e.g. expertise, competence, decision making skills, organizational and facilitation skills). The implications of this study for programs and workshops that aim to develop teacher leadership are that these should help teachers develop a common vision for leadership in order to address the misconceptions teachers hold about leadership. Hanuscin, Rebello, and Sinha (2002) indicated that misconceptions about teacher leadership can inhibit leadership development. Professional developers can play a role in supporting the development of teacher leaders by helping the teachers develop a shared vision of leadership, explore the leader within, and build their leadership knowledge and skills by providing opportunities for teachers to examine their conceptions of leadership and broaden their perspectives (Hanuscin et al.). Zinn (1997) also supported the notion of clarifying teacher leadership roles, as the lack of clear role definition for teacher leaders was identified as one of several barriers that exist within educational contexts to teacher leadership.

### Summary

This section discussed the themes that were identified through the review of 20 articles in the literature that addressed teacher leadership development. Critical reflection and problem solving, increasing pedagogical and content knowledge, collaborating, and having a clear definition of teacher leadership were identified as components that help support the development of teacher leadership.

### Professional Development Programs That Focus on Leadership

Through the review of the literature, several components were identified as supports to teacher leadership development. While much is known about the potential impact teacher leaders can have on school improvement efforts, less is known about how teachers develop leadership skills and move into leadership roles. Professional development programs have been identified as a potential way for science educators to develop leadership skills. It is interesting to note that there are a variety of opportunities for educators that focus on educational leadership, however, most of these programs aim to prepare educators to move out of the classroom and into administrative positions. There are fewer programs specifically intended for classroom teachers who wish to act as leaders while maintaining their role as a classroom teacher. This section will examine and discuss professional development programs that focus on developing teacher leadership in relation to the components addressed in Table 3.

The research literature converges on defining effective professional development as professional learning that develops teacher content knowledge, allows for active learning sustained over time, focuses on student learning, and provides opportunities for collective participation (Mayer & Lloyd, 2011). While the literature has much to say about what teacher leadership might look like and how it can act as a mechanism for school reform, there has been “less guidance related to the development of teacher leadership within graduate programs for practicing teachers” (Ross et al., 2011, p. 1213). This section discusses the outcomes of several teacher professional development programs, as well as a preliminary study of the MSSE program and an evaluation of the

curriculum provided by the MSSE program. The professional development programs discussed provide some insight into how teacher leaders are developed and what leadership development components that were identified in the literature are included.

### Professional Development Programs

There are many professional development programs available to educators, and several specific programs are discussed in the literature. From the programs represented in the literature, four were selected for examination here based on their specific focus on producing teacher leaders or on providing professional development to science teachers. These programs were examined to elicit the components which contribute to the development of science teacher leadership that could be incorporated into a professional development program. The name and overall focus of each individual program is shown in Table 4; each program is described in turn. Following the description of each program, the components which contribute to the development of science teacher leadership identified through the examination of these programs will be discussed.

Table 4  
*Teacher Professional Development Programs from the Literature*

Program	Focus
East Tennessee State University Science Partnership (ETSUSP)	Provide teacher institutes that develop pedagogical and science content knowledge
BrainSmart degree programs through Nova Southeastern University	Provide three graduate degree programs that focus on brain-based teaching skills.
Master's in Teacher Leadership Program through Montclair State University	Focused on teacher leadership utilizing action research.
Teacher Leadership for School Improvement (TLSI) program	Graduate program, focused on developing teacher leaders through job-embedded learning, inquiry and reflection, and professional learning communities.

The first program examined was the East Tennessee State University Science Partnership (ETSUSP) program. This program recognized the importance of teacher leadership in relation to the success of reform efforts. The science partnership program utilized a team model, where middle and high school science teachers participated in summer institutes. The program focused on creating partnerships between educators at varying levels in order to provide sustained professional development and support throughout the school year. The summer institutes offered focused on science content and inquiry in teaching and learning (Rhoton & McLean, 2008). Ongoing support was provided for participants through university science faculty school visits.

The second program was a degree program offered at Nova Southeastern University through the BrainSmart program. The BrainSmart program aimed to develop the skills that would lead to teacher leadership (Germuth, 2012) through a focus on brain-based teaching. The program results were supported by survey data. Three degree programs at Nova Southeastern University were available through the BrainSmart program, each focusing on brain-based teaching. Program participants had the option of enrolling in degree programs to earn a M.S degree with a concentration in teaching and learning, a M.S. degree with a concentration in reading and literacy, or an Educational Specialists degree with a concentration in instructional leadership. All three programs provided training on brain-based teaching and focused on equipping teachers with knowledge to best utilize an understanding of student learning, cognition, and teacher leadership in the classroom and beyond.

The third program examined was a master's in teacher leadership (MTL) program. The program aimed to provide practicing teachers with the requisite knowledge, skills, and dispositions needed to be successful in the classroom and aimed to provide opportunities for educators to actively engage with their professional peers and community members in order to become successful leaders (Taylor, et al.). This master's degree program focused on using action research to aid teachers in the development of leadership skills.

A fourth program examined was a graduate program, and was referred to as the Teacher Leadership for School Improvement (TLSI). This program intended to develop teacher leaders, and focused upon four principles: job-embedded learning, inquiry and reflection, collaborative learning, and the enhancement of leadership learning at partner schools. This program was a blended online face-to-face program, in which educators from the same school district were enrolled at the same time as a cohort. The professional learning communities within each school served to support collaboration and inquiry about teaching practices and student learning.

Evaluation of the Professional Development Programs. The literature describing the four professional development programs previously discussed provided program evaluations to some degree. This provides much needed information regarding the outcomes of such leadership development programs, because as Ross et al. (2011) noted, while there are graduate programs that target teacher leadership, there is little research about the impact of these programs. This section will discuss the evaluations and findings regarding each of the four programs.

The East Tennessee State University Science Partnership program utilized summer institutes. In evaluation of the 2006-2007 cohort of the program, teachers were given a pretest and post test following the summer institutes to measure their science content and pedagogical content knowledge. The pretest score mean was 51.7 (n=21) and the posttest score mean was 73.7. This gain was reported as statistically significant ( $t(20) = 15.64, p < .001$ ) with an effect size of 2.29 (Rhoton & McLean, 2008). Program participants also responded to a seven item survey. Teacher leaders reported (84%) that the university personnel demonstrated how project materials and resources could be presented or shared with peers and (100%) agreed that the instructional methods and procedures demonstrated by university personnel helped them in learning more effective methods of delivering their science curricula (Rhoton & McLean, 2008).

The BrainSmart graduate programs were extensively evaluated in a study that was implemented to document how these graduate degree programs contributed to the development of teachers as leaders, including providing them with the knowledge, skills, and practices consistent with the model teacher leader standards and Georgia state teacher leadership standards. The study was conducted to (a) determine the extent to which program graduates engaged in leadership activities, (b) identify which teacher leadership activities participants were most involved in, (c) identify how participants were using these skills to improve teaching and learning in their schools, and to (d) determine the extent to which program prepared participants for service as teacher leaders.

BrainSmart program graduates responded positively via survey, with 93% of respondents indicating a continued involvement in leadership activities (Germuth, 2012).

Teachers also strongly credited their graduate education with their development as teacher leaders (91%). Teachers reported that the programs provided them with important research-based strategies that enabled them to reach the twin targets of teacher leadership: becoming a better teaching professional and taking classroom expertise into the broader community of their school and beyond (Germuth). Graduates stated that they felt they had more knowledge about how students learn and knew how to teach more effectively. Furthermore, they were more likely to assist other teachers through mentoring and professional development. Having been engaged in cutting edge knowledge and experiences that assisted them to become more confident experts, assuming a formal or informal role as a teacher leader was the logical next step for many program graduates (Germuth).

In evaluating the impact that the Master's in Teacher Leadership (MTL) program had on the development of teacher leadership, participants responded via exit interview that their beliefs about and understanding of teacher leadership were influenced in specific ways through the participation in the program. Their coursework led them to identify their professional voices, helping them transition from viewing themselves as passive receivers of information to active constructors of knowledge (Taylor et al., 2011). Most participants reported that when they had entered the program, they did not view themselves as having the ability to influence change, except perhaps in their work with their own students. As they engaged in their own learning, they came to understand their work from the perspective of a leader, acting as a member of a school community. Through participation in the teacher leadership program, participants simultaneously

constructed and applied new knowledge and understandings, which led to new initiatives. Taylor et al. cited the engagement in ongoing reflection and action, meaning making and practicing leadership as being immensely important for developing teacher leadership (2011).

The Teacher Leadership for School Improvement (TLSI) program also collected data from program participants to measure the extent to which participants felt the program supported teaching and leadership skills. Teachers' statements were collected via phone-based interviews. These suggested that they believed their perspectives related to teaching and leadership had been changed (Ross et al.) by participating in the TLSI program. All participants described ways their knowledge and skills had changed, specifically their frames of reference in teaching and leadership. The descriptions teachers provided indicated they had developed new ways of thinking about their teaching practice (Ross et al., 2011). Teachers also learned to view themselves as autonomous professions who had the awareness of the impact they could have in their schools and classrooms. Principals of the program participants indicated that the graduates had developed the confidence and drive to locate information to improve their practice (Ross et al., 2011). Following the program, many participants took on leadership roles, indicating that the program helped participants to adopt a leadership stance and view students' learning as a communal responsibility.

Preliminary Study of the MSSE Program. In the fall of 2013, this researcher conducted a study of the MSSE program. The objective was to determine how graduates of the Masters of Science in Science Education (MSSE) program defined teacher

leadership, and whether graduates felt their participation in and completion of the MSSE program impacted their roles as teacher leaders. The preliminary study asked the following research questions:

1. How do graduates of the MSSE program define teacher leadership?
2. What activities or roles do graduates consider to be leadership roles?
3. What are MSSE program graduates' perceptions of how their participation in the MSSE program influenced their school leadership roles?

A questionnaire was administered to the 2011 and 2012 graduates of the MSSE program via e-mail. It was sent to 187 program graduates, with 51 graduates responding. The questionnaire included Likert items as well as an open-ended response item. Forty-one graduates responded to the open-ended question: Do you consider yourself a teacher leader, and if so, why? These comments were coded into eight categories of leadership roles that program graduates were involved in: collaborating with colleagues, providing trainings or professional development, modeling best practices, sharing information with and helping colleagues, serving on committees, encouraging colleagues to participate in professional development, and implementing and sharing knowledge about up-to-date research and technology. The categories identified and their frequencies are displayed in Table 5.

Table 5  
*Leadership Roles MSSE Graduates Reported Taking; n=41*

Categories	Number of Responses Pertaining to Category
Share Information and Help Others	19
Model Best Practices	6
Incorporate Up-to date Research/Technology	6
Collaboration	5
Provide Trainings and Mentoring	4
Encourage Professional Development	2
Committee Involvement	1

Data was also collected on the impact program graduates felt the MSSE program had on their involvement in leadership roles or activities. Responders were asked to rate on a scale from one to five, the degree to which their involvement in the MSSE program supported their development as teacher leaders. As shown in Table 6, the majority of responders felt that the MSSE program supported their development as teacher leaders; half of them, to a great degree.

Table 6  
*Graduates' Perceptions of MSSE Program Impact on Their Development as Teacher Leaders; n=50*

Extent of Program Impact	Percentage of Responses
1, Not at all	0
2	8
3	18
4	22
5, To a Great Degree	52

Data collected from the preliminary study informed the researcher of this study in that it provided examples of how MSSE program graduates defined leadership and also indicated the extent to which the MSSE program was perceived as contributing to their development as teacher leaders. However, the preliminary study did not identify what components of the MSSE program aided in the development of teacher leadership, which the present study aims to do.

In addition to the preliminary study of the MSSE program, this researcher examined the format and components included in the MSSE program using information provided by the program on the program webpage. The review of the MSSE program and an overview of the program structure and course offerings will be discussed in more detail in Chapter 3, however it is pertinent to note that in the findings of the program review, it was identified that the MSSE program thoroughly incorporates nearly all of the components that have been identified in the literature as supporting teacher leadership development. The components that contribute to leadership development as identified in

the literature were addressed in depth in this chapter, and the citations for each of the individual components can be found in Table 3.

### Summary

Existing teacher leadership development programs, as well as the MSSE program, were examined in order to determine whether programs included specific factors that could be identified as contributing to the development of teacher leaders. The factors that were identified through self-reporting of graduates from these programs as providing support were developing self-efficacy, utilizing data for decision making, reflecting upon practices, increasing pedagogical and content knowledge, utilize research-based practices, and utilize discussion and collaboration with other educators. The supports reported by program participants as contributing to their leadership development served to provide evidence to the components identified in the literature, as many of the supports coincided with the components identified in Table 3.

### Conceptual and Theoretical Frameworks

The involvement in teacher leadership was viewed from two different angles for this research. The first focused on the development of components and dimensions that supported teacher leadership, and the second focused on of the pathways taken by teachers as they moved into leadership roles. Each will be discussed below.

### Leadership Qualities and Development Framework

As previously discussed through the review of 20 articles and four professional development programs and shown in Table 3, several components that support teacher leadership were identified. In addition to these components, in their 2000 study, Snell and Swanson tested a proposed conceptual framework with teacher leaders to better develop a conceptual framework that captured the essential practices of teacher leadership in action. According to Snell and Swanson (2000), it was necessary to uncover the curriculum which allowed teachers to undergo the learning and growth required to become leaders. Their study set out to do that, with the end result providing a final framework with four dimensions of teacher leadership. The final framework provided by Snell and Swanson (2000) included the following four dimensions:

1. Empowerment: Empowered teachers are confident in their ability to make a difference in student learning. They exhibit a high degree of agency through their willingness to take risks and to “step up to the plate,” and their resourcefulness as problem solvers. Teachers who are empowered are characterized as optimistic, determined, and self-actualized. At the highest levels, these teachers are skilled in empowering others.
2. Expertise- Fueled by a passion for their subject area, expertise in teaching requires deep pedagogical content knowledge. These teachers have a keen understanding of their students’ cognitive and developmental capacities and they are skilled at creating varied and rich curriculum to motivate and challenge their students. Expert teachers understand the goals or standards that must be met—

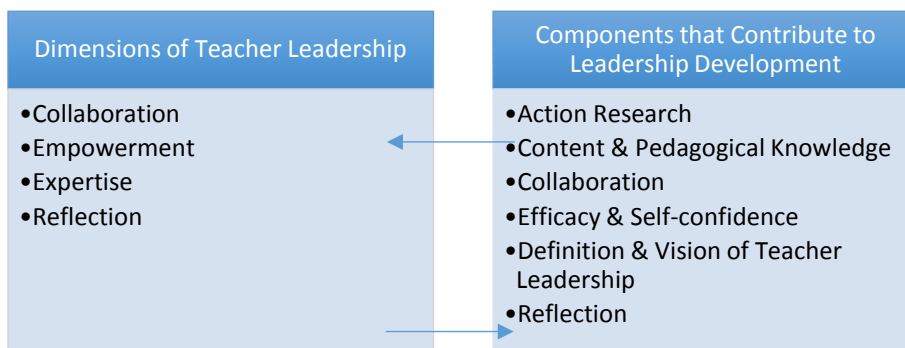
they are able to analyze where their students are now and where they need to go. They can break their teaching down into manageable and well-sequenced mini-lessons to scaffold student learning towards meeting learning goals. These teachers are marked by a commitment to rigor and high expectations for themselves and their charges. Expert teachers seek out on-going opportunities to enhance and refine their craft.

3. Reflection- Reflective practitioners are able to discern what is happening in the classroom and adapt their efforts by understanding the perspectives of others, while at the same time, being conscious of their own values, thoughts, and biases. Committed to improving one's teaching by using reflection as a vehicle towards change, reflective teachers are willing to ask themselves, "how can I change to improve this situation?" Or, "what can I do differently?" thus requiring a high degree of agency and personal responsibility. Such practitioners are committed to entering into reflective dialogue with their colleagues as a regular component of professional lives.

4. Collaboration- Characterized by a high degree of collegiality and cooperation, collaborative teachers value consensus and compromise rather than competition. They recognize that collective expertise offers the possibility of generating optimal solutions to the complex problems of teaching and learning. Such teachers demonstrate strong communication skills, such as inquiry and active listening. Collaborative teachers position themselves to be purposefully accessible to their students and peers. (Snell & Swanson, 2000, p. 7).

The literature regarding teacher leadership development supported the framework put forth by Snell and Swanson (2000), as many of the components (Table 3) identified as contributing to leadership development overlapped with the four dimensions included in Snell and Swanson's (2000) conceptual framework. The relationship between the four dimensions and the components identified as contributing to teacher leadership development are shown in Figure 1.

Figure 1  
*Dimensions of Teacher Leadership and the Components that Contribute to Leadership Development*



### Pathways to Leadership Framework

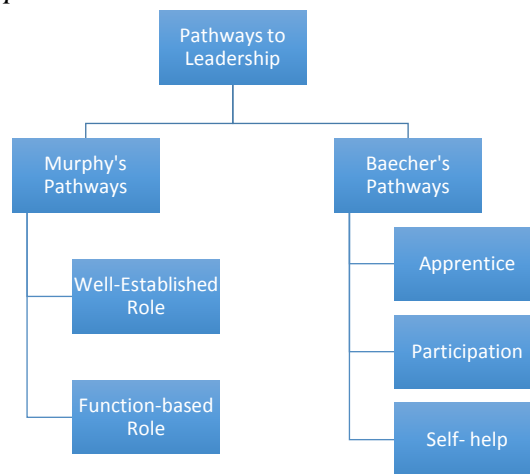
The second angle from which involvement in teacher leadership roles was examined was based on the pathway teachers took as they moved into roles of leadership. Identifying the pathways teachers take has been proposed as topic for further research, and at the time of this study, there was not a great deal of information regarding teacher leadership pathways in the literature. The literature that was available focused primarily on classifying the types of pathways that exist. Murphy (2007) acknowledged that there are a variety of pathways to teacher leadership, but indicated that most fall into one of

two categories: the well-established role, and function-based attempts to create leadership-dense schools (Murphy, 2007). The well-established role includes pathways into leadership that are formally assigned, whereas function-based attempts may be driven by teachers' observation of a need that is not being met. Baecher (2012) identified similar pathways in a study that collected data from forty graduates of a master's degree program in teaching English to speakers of other languages. Many teachers who responded that they had moved into an informal leadership pathway, indicated that this was initiated to fill a void in meeting student needs (Baecher, 2012). Teachers had identified a need and voluntarily began to try to address it. Often times, this was followed by a request to continue the leadership work in a more formal manner. Participants in Baecher's study indicated that direct formal pathways into teacher leadership roles came in the form of a personal request from an administrator or a request from another teacher leader.

In addition to the well-established leadership role and the function-based leadership role, which can be thought of as formally assigned and self-assumed, another model that attempts to explain possible leadership pathways taken by teachers was identified by Baecher (2012). The categories included in this model were apprentice, participation, and self-help. The apprentice category focused on the teacher learning new skills and techniques through the relationship with an administrator or teacher leader. The participation category focused on the teacher observing and participating in an activity for a period of time prior to being asked to fully join in the activity. The self-help category referred to teachers who responded to a need that was not being met by the

school by filling the role, and aligns with the function-based role as described by Murphy (2007). However, in contrast to Murphy's model, the focus in this model is on how much support the educator is given as he or she moves into the leadership role.

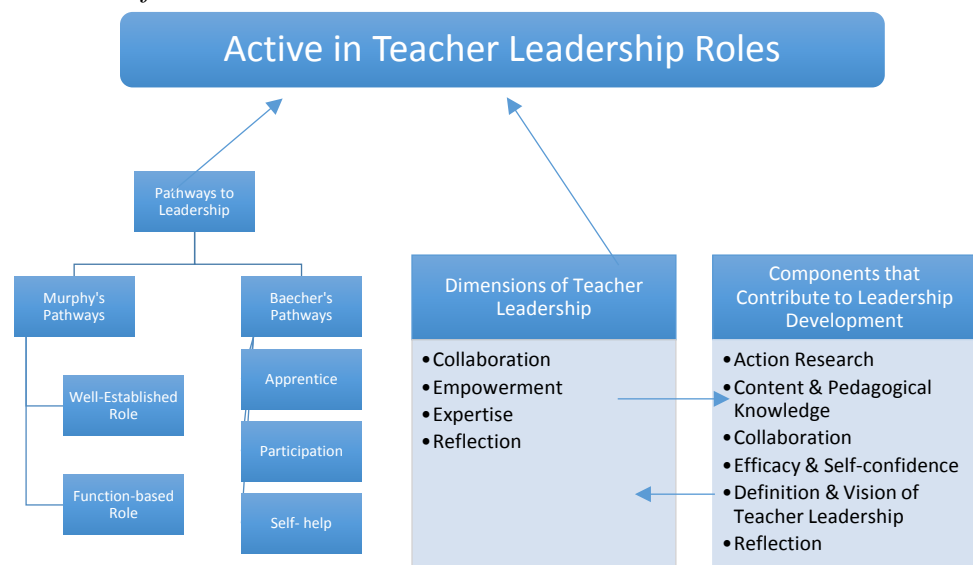
Figure 2  
*Pathways to Teacher Leadership*



Baecher's leadership pathway model indicates a varying level of support for educators as they transition into leadership roles. Not all teachers have the opportunity to learn new skills under the guidance of a more knowledgeable colleague. There is evidence that teachers are not always prepared to assume the leadership roles they are asked to take on (Smyser, 1995). Murphy (2005) supports this view, and points out that little is done at the school and district level to overcome leadership skill deficiencies. Smyser (1995) identified lack of training as a major obstacle in establishing leadership, and called for education programs that specifically train teachers to take on leadership roles. Figure 2 shows provides a framework that demonstrates the existing pathways to teacher leadership.

The two views of teacher leadership, how teacher leadership is developed, and what pathways teachers take to move into roles of leadership merge to form the conceptual framework that guided this study, as shown in Figure 3. In order for teachers to be involved in teacher leadership, teachers must be provided with the supports needed to develop the dimensions of teacher leadership, and must be provided with pathways that allow them to move into leadership roles. These two view points both contribute to the extent to which a teacher is involved in teacher leadership, and both view points address research questions that were posed by this research, as this research focused on identifying the pathways teachers took as they moved into leadership roles as well as the supports provided by the MSSE program as perceived by program graduates.

Figure 3  
*Conceptual Framework for Research*



The study of the pathways taken to leadership can be viewed as situated within the distributed leadership theory, as the distributed leadership theory focuses on how leadership is spread over individuals in a system.

### Distributed Leadership

Distributed leadership is often cited as a means to improve the quality of instruction and manage the many tasks that schools must accomplish. However, the term distributed leadership is used freely in many contexts without a clear definition. This research relied on the definition provided by Spillane, Halverson, and Diamond (2001) in that distributed leadership is best understood as a leadership practice stretched over the school's social and situational contexts. Halverson & Clifford (2013) elaborated this definition, stating that distributed leadership investigates two dimensions of practice: the social distribution of leadership, which describes how tasks are shared and co-created across multiple individuals, and the situational distribution, which, describes how tools such as policies, procedures, curricula, and instructional materials create opportunities to exercise effective leadership. Both Spillane et al. and Halverson and Clifford focused on distributed leadership in the sense of instructional leadership, in that "the work of school leaders is not just limited to navigating within a context, it is also to reform contexts to improve teaching and learning" (Halverson & Clifford, 2013, p. 390).

One of the tenets of the distributed leadership perspective is that the approach to theorizing about organizational leadership no longer solely focused on leadership stemming from one person at the top. Spillane (2006) states two central ideas important

to discuss when writing about and focusing research on distributed leadership. The first idea is that it is important to acknowledge the following premises:

- leading and managing of schools involves multiple individuals,
- is not limited to the school principal,
- and includes both leaders with formally assigned roles and leaders without formally assigned roles.

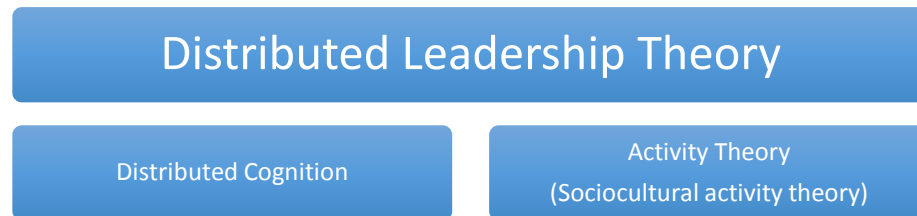
In this way, the perspective of distributed leadership acknowledges how the two aspects of the organization of the school, the formal roles and the informal roles, work with one another (Spillane, 2006; Spillane & Diamond, 2007). The acknowledgement of these three ideas is emphasized because much written about distributed leadership utilizes a limited focus, and only examines those individuals taking direct responsibility for leadership, or leading from formally assigned roles. The shortcoming of this limited view is that it fails to acknowledge those individuals serving in leadership capacities through informal roles as well as the interrelationships between formal and informal groups of leaders (Spillane & Diamond, 2007).

The second idea focuses on the importance of acknowledging teacher leadership in the research of school leadership (Spillane, et al., 2001). “If leadership is an organizational quality, then investigations of leadership practice that focus exclusively on the work of individual position leaders are unlikely to generate comprehensive understandings of the practice of school leadership” (Spillane, Halverson, & Diamond 2004, p. 6). The examination of leadership practice needs to be viewed in terms of the interactions among organizational members as enabled and constrained by aspects of

their situation (Spillane, et al., 2001). Hence, from a distributed perspective, studying the practice of leading requires examining how the practice is shared between school leaders, followers, and aspects of their situation. Careful attention to interactions rather than fixating exclusively on the actions of an individual leader, is necessary when taking a distributed perspective to school leadership.

Distributed leadership theory, as proposed by Spillane, et al. (2001) and supported by Halverson & Clifford (2013), is built upon the concepts and theoretical underpinnings of situated cognition, in which investigations aim to situate thinking in the context in which it occurs (Lave & Wenger, 1991), and distributed cognition, in which human activity is distributed situationally and socially, through collaborative efforts to complete complex tasks (Spillane, et al., 2004). Figure 4 presents the theoretical framework that underpins the distributed leadership theory.

Figure 4  
*Theoretical Framework*



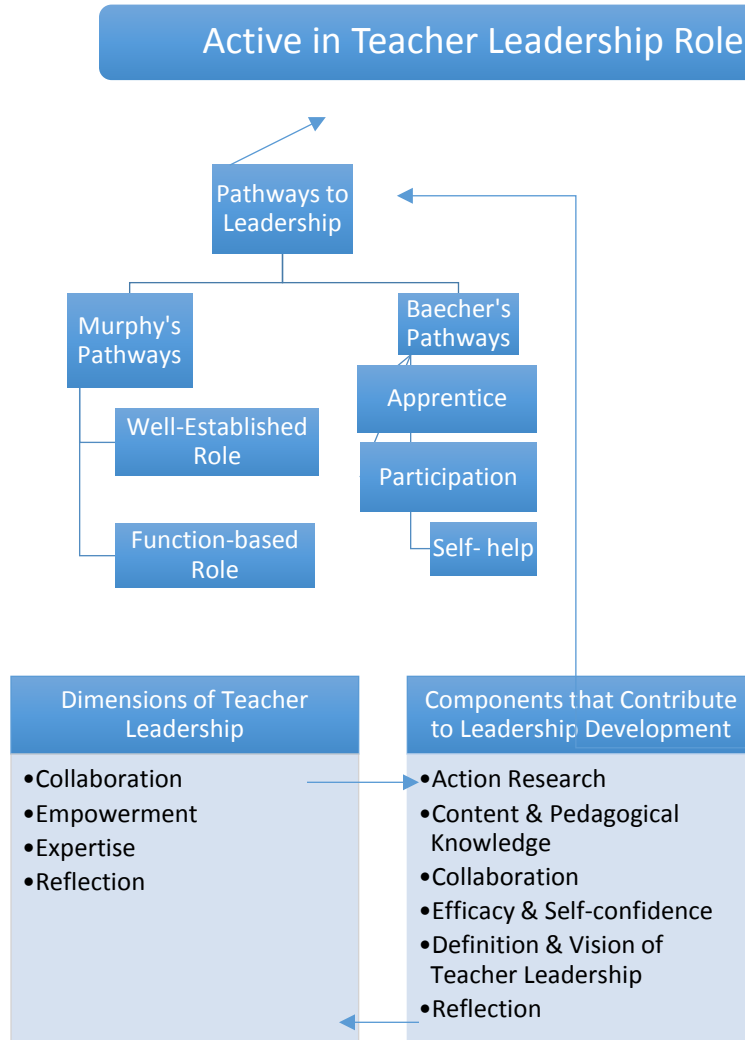
The work of the distributed cognition theory put forth the importance of understanding and including the components involved in thinking. Thinking cannot be analyzed as simply what takes place in one's head, but requires an understanding of how tools, contexts, language, and social interaction constitute cognition (Halverson & Clifford, 2013). From this view, the individuals, tools, and environments become the unit

of analysis, which in an educational setting, is referred to as the learning environment. The theoretical focus is on how cognition is distributed across people and artifacts, and how it depends on both internal representations, such as thoughts, and external representations, such as language.

The work of Spillane, et al. (2001) in reference to the distributed leadership theory also incorporated activity theory, in that the “social context is an integral component” (p. 23) for intelligent activity. Activity theory focuses on the activity of a group or team directed at an object or goal. Activities may be mediated by an organization or a community. Halverson & Clifford (2013) cite a similar approach through the analysis of situational distribution, as it provides a means to understand how leadership practice is shaped by the school context and how leaders seek to reshape the situation of teaching and learning. Gronn (2000) stated that from a focus on activity theory, in a distributed leadership framework, interaction between individuals plays a central role in creating effective leadership. From this view, it is understandable that distributed leadership, specifically teacher leadership, has been identified as a potential approach in reforming schools (Darling-Hammond, 1997).

Figure 5.  
*Theoretical and Conceptual Framework*

**Conceptual Framework:**



**Theoretical Framework:**



### Summary of the Literature Review

Science education has gone through many phases of reform, with the adoption and implementation of the NGSS being the next phase that will need to be addressed. Teacher leadership was identified as having an important role in reforming science education. Teacher leaders were shown to have the potential to impact school improvement efforts through the view of using distributed leadership in schools, where teacher leaders take on roles and responsibilities to make positive changes.

Teacher leadership characteristics and skills and teacher leadership roles were identified, in order to demonstrate what characteristics are needed for a teacher to be a leader, and to demonstrate what sort of tasks or roles teacher leaders may take on. Through a review of four teacher professional development programs and 20 articles regarding teacher leadership development, the following components were identified as contributing to the development of teacher leadership skills: reflection, collaboration, pedagogical and content knowledge, efficacy, action research, and a clear definition of teacher leadership. These components were identified as having a positive impact on the development of teacher leadership skills, and were also used to analyze the MSSE program to determine whether the program has the potential to support the development of science teacher leaders.

The theoretical and conceptual framework that guides this research was discussed. The conceptual framework consisted of two view points that both affect teacher involvement in leadership: the pathways that teachers take as they move into leadership roles, and the components that support leadership development. The study of teacher

pathways can be situated within the study of the distributed leadership theory. The theoretical framework that supported this theory was also discussed.

Science education is undergoing some changes, as the NGSS standards begin to be adopted at the state level and implemented at the district level. Schools need science educators who have the ability to lead the discussion of how these new standards are to be implemented. Identifying the pathways teachers take as they move into roles of leadership, determining how teacher leadership and distributed leadership in schools can be facilitated and developed, and exploring the models, approaches and forms of teacher leadership that exist in practice will provide a more encompassing picture of what the development and transition into roles of teacher leadership looks like and how this development and transition into leadership can be fostered.

## CHAPTER THREE - RESEARCH METHODOLOGY

### Introduction

This chapter describes the design of this study and provides background information regarding the objectives of the study and the selection and use of specific research methods, data collection processes, and data analysis techniques. This research involved a mixed-methods design that utilized both quantitative and qualitative techniques. The problem addressed by the study is that there is little known about the pathways teachers take as they move into roles of leadership and what is involved in distributing teacher leadership. It is also difficult to identify how teacher leadership is developed through professional development programs. The purpose of this study is to provide clearer examples of the pathways teacher take as they move into leadership roles, and to examine the extent to which program participants perceive the MSSE program as providing support in the development and progression of their leadership skills.

### Research Questions

The central research question was: How do MSSE graduates move into roles of teacher leadership? The sub questions were:

1. What pathways do teachers take in moving into roles of leadership?
  - 1a. Were educators assigned a role, recruited, or self-motivated?
  - 1b. What other motivations were involved?
2. How do MSSE program graduates demonstrate progression in their involvement in leadership?

3. How do MSSE program graduates perceive that the MSSE program contributed to a progression in their leadership involvement and/or development?

3a. What specific supports did the program provide?

3b. Is there a relationship between MSSE program graduates' perception of the extent to which specific factors encouraged them to take on leadership roles and the extent to which they perceived the MSSE program supported the development of these factors?

### Context of Study

This section will discuss the format of the MSSE program, the course offerings, and participants involved in the MSSE program. This section will also discuss the potential benefits the program may provide as identified by this researcher in a previously conducted review of the program curriculum.

### Background of MSSE Program

The Master of Science in Science Education (MSSE) program is a graduate program for science educators that allows educators to maintain their role in the classroom while seeking professional development. The MSSE program has a dual focus as a means for professional development for science educators, as it offers a variety of science content courses as well as courses focusing on teaching pedagogy. The program aims to improve how science is taught by supporting the use of effective science teaching strategies and by increasing teachers' science content knowledge. The MSSE website provides the following mission for the program:

The mission of the Master of Science in Science Education (MSSE) program is to provide an exemplary, accessible, responsive, and student-centered science and applied science education master's degree resulting in enhanced teaching and learning of science for educators and their students. ("Mission, vision, and goals," n.d., para. 1)

The vision of the MSSE program is to promote the use of effective and innovative science teaching to a diverse community of science educators through online and on-campus graduate courses designed specifically for science educators with a dual focus on content and pedagogy ("Mission, vision, and goals," n.d., para. 2).

#### Program Accessibility

The MSSE Program is unique in that it is an inter-college, interdisciplinary program housed in The Graduate School at Montana State University-Bozeman. The majority of courses may be taken through online, asynchronous, computer mediated communication, allowing students the flexibility to participate from anywhere, and to fit course work around their teaching positions. The program of study for most students includes approximately 80% of the coursework being completed online. This offers students, who are primarily practicing science teachers, the flexibility and convenience to participate in a graduate level program while continuing their careers.

Students are required to be on campus for a minimum of two weeks as they pursue their MSSE degree. Students typically spend a minimum of one week on campus to take a laboratory or field-based course. A second week on campus is required to present the culminating capstone project during the annual symposium in science education. Most students complete the degree within two to three years, and there is a

six-year window of completion for master's degree coursework that is required by The Graduate School.

### Program Participants

The MSSE program attracts a variety of K-14 science educators from all fifty states and several countries. Participants are admitted throughout the year through an application and admission process. Some participants opt to take a course through the program prior to being formally admitted. Applicants must have a bachelor's degree in science education, science, or k-12 education, and are required to have two years of teaching experience. The teaching experience is not limited to classroom teaching experience, but includes serving in informal science settings such as through a museum or outdoor education program.

### Program Courses

According to the MSSE webpage ("MSSE degree program," n.d., para. 3), students can select from a variety of course offerings in biology, chemistry, earth science, ecology, education, engineering, environmental science, land resources, microbiology, physics, and plant sciences. The courses may be taken for professional development or to earn a graduate degree. Students complete a group of education focused core courses, which accounts for 14 credits and includes a three-credit capstone project. Students select interdisciplinary combinations of science courses, selecting courses of interest or those deemed applicable to their teaching position to account for 12 credits. The final four credits in the 30-credit program are electives selected from education and/or science

courses (“MSSE degree program,” n.d., para. 3). Table 7 provides a list of the core education courses and the course descriptions for each course as described on the MSSE website (“MSSE course catalogue, n.d.).

Table 7  
*MSSE Education Core Courses and Course Descriptions*

Course Title	Course Description
Inquiry Through Science and Engineering Practices	<p>Using many of the current pedagogical approaches of instruction including constructivism, misconceptions, models of inquiry instruction, the learning cycle, reflective practice, conceptual change theory and others, students in this course will critically examine their current instructional practice and together craft new approaches to teaching inquiry in the science classroom.</p> <p>Course assignments include readings, reflections on classroom discussions and content, evaluation of inquiry research by MSSE graduate candidates and the completion of an individualized inquiry project.</p> <p>Students in the course can expect a highly active, fully engaging, professionally stimulating class session each week.</p>

Table 7 Continued

Assessment and Evaluation in Education	Evaluation is an ongoing process in education. This course will engage teachers in an ongoing discussion and study regarding the construction, selection and use of criterion-referenced, norm-referenced, and alternative assessment methods. The teachers' instructional settings (classrooms, museums, aquariums, outdoor schools, etc.) are used as "research bases" to conduct classroom assessment studies. The results of the assessments provide immediate feedback on both teacher effectiveness and student learning.
Foundations of Action Research in Science Teaching and Learning	A course in the design of action research-based educational research for practicing teachers and informal science educators. Students will learn the basis of action research in professional development and construct an action research proposal based on their individual teaching situation
Implementing Action Research in Teaching and Learning	A course in the implementation of action research for practicing teachers. Students will learn how to effectively conduct action research based on their individual teaching situation and its implications for their professional development.

Table 7 Continued


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Professional Capstone Paper and Symposium in Science Education	<p>Each Master of Science in Science Education (MSSE) student, with the cooperation of her or his graduate committee, identifies and completes a science education capstone project. Each project is designed to provide experience and information that aids our understanding of science teaching-learning or science curriculum. The capstone project topic is identified during the student's graduate program and relates to science education in the student's educational setting; it links multiple courses in the student's program of study in both the core and science content areas. A student begins the capstone in the fall of the final year by submitting a brief proposal to his/her advisor.</p> <p>The result of each student's capstone project is summarized in a written, professional paper completed by mid-term of the final summer session. In addition, during the final summer session of a student's graduate program each student presents their capstone project to their committee, their classmates, and other interested persons at the <i>Symposium in Science Education</i>.</p>
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### Potential Skills Gained through MSSE Program Participation

The curriculum provided through the Master of Science in Science Education (MSSE) program was reviewed in fall of 2014 as a preliminary step prior to the start of this study in order to determine whether and to what extent the program included the components identified in Chapter 2 as supporting the development of teacher leadership. This researcher felt that the program provided many of the components identified, and the components provided by the MSSE program will be further discussed.

Two of the components which were identified as supporting the growth of science teachers as leaders were developing a background in pedagogical knowledge and having the ability to utilize various instructional strategies (see Table 3 in Chapter 2). The MSSE education core courses include an inquiry into science and engineering course, which focuses on building pedagogical knowledge. There are several other courses that are consistent with and support the use of inquiry-based instruction. These courses have the potential to provide educators with an opportunity to grapple with varying learning theories and approaches. These courses also have the potential to support science teachers in building their confidence in their abilities to utilize different instructional strategies and to determine the appropriate instructional strategy in relation to the expected learning outcome.

An increase in content knowledge was also identified as a component that supported the development of teacher leaders (Table 3). The MSSE program requires graduate degree seeking students to take a minimum of 11 science credits. The science courses offered cover a variety of scientific fields; including but not limited to courses

about microbiology, ecology, botany, physics, chemistry, research and field studies, geology, and paleontology. Students may select the science courses they take, allowing students to select courses that fill gaps in their own content knowledge and provide them with educational experiences that deepen their current understanding. It is thus reasonable to consider that participation in the program would greatly increase a participant's science content knowledge. The MSSE program goals provided on the MSSE website ("Program goals", n.d., para. 3) support this view, as one of the program goals is "to increase educators' knowledge and understanding in the scientific subject areas". Other program goals that emphasize increasing science content knowledge include utilizing the unique environment of Montana and the Greater Yellowstone Ecosystem to teach scientific principles and provide models of field-based instruction, and providing educators with experiences in using laboratory skills and/or field experiences to demonstrate scientific principles.

Another component identified as supporting teacher leaders is the opportunity to discuss and reflect (Table 3). Teachers are rarely given time within the school day to discuss and reflect upon lesson plans and the use of instructional strategies with their colleagues. The MSSE program provides an excellent opportunity for discussion and reflection, as the online courses utilize an asynchronous format. This format often allows more discourse than traditional courses, as all students have the opportunity to comment and contribute to the discussion over the course of the week. Face-to-face courses can limit discussion to those who are more outspoken, and can also limit the depth of the conversation due to time constraints. The discourse and collaboration provided through

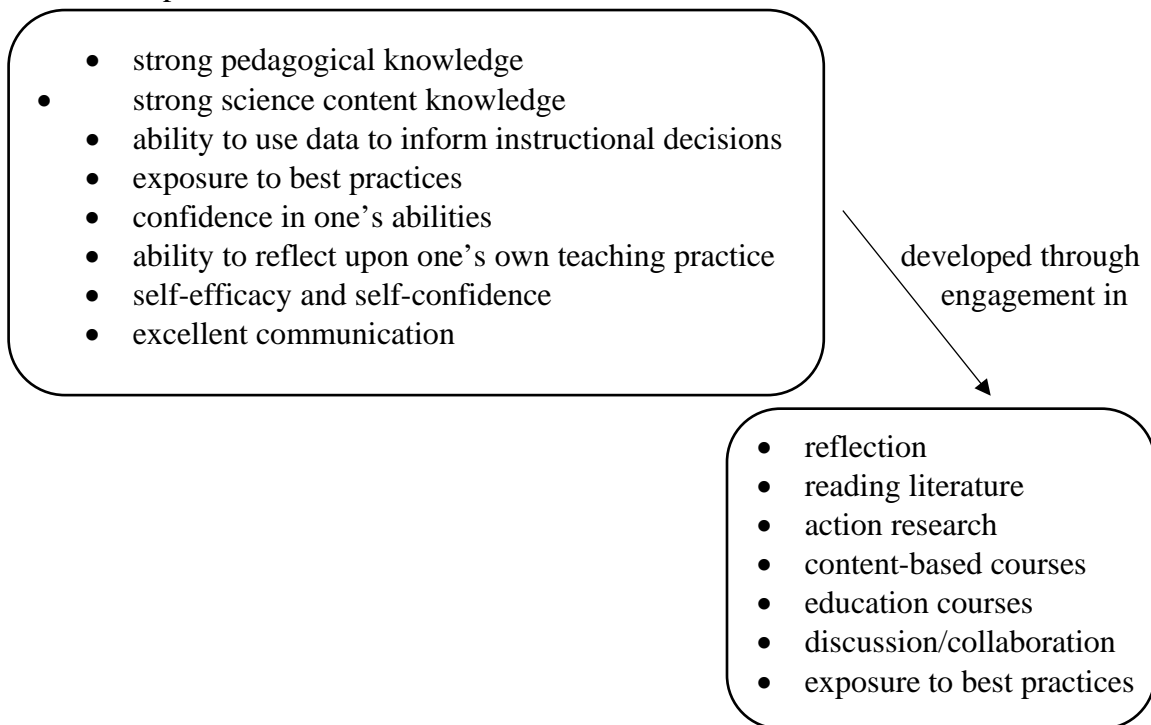
the discussion board utilized by online courses in the MSSE program is particularly valuable because this program provides a wide variety of educators with access to each other. The program brings together science educators from differing parts of the country, with differing grades and science subjects, and with varying levels of experience, and provides them with a forum to have a structured discussion regarding educational topics. Through the discussion board, students have the ability to discuss, pose questions and responses, and share insights with one another. Educators learn from this discussion, as they are exposed to a broader perspective, and are able to better reflect on how to incorporate instructional strategies and apply course readings into their own teaching situations (Ross et al., 2011).

The MSSE program focuses on the professional development of science educators through the offering of educational core courses as well as various science content specific courses (Table 3). Based on the components identified in the literature, the program incorporates nearly all of these components into either the education or science curriculum. Skills that were identified as contributing to the development of teacher leaders included the ability to use data for decision making, the ability to reflect on one's practice, having a strong pedagogical knowledge, having a strong content knowledge, having had some exposure to research-based practices, having had opportunities to discuss and collaborate with colleagues, and having a strong self-efficacy (Thomas, 2011; Hunzicker, 2012). Instructional activities provided by the MSSE program that supported the development of these skills included reading and reflecting upon educational literature, conducting action research projects, reflecting upon one's own practice, and

discussing course readings with colleagues. The MSSE program indicated through course descriptions, program mission and vision statements, and program goals that these activities are not only incorporated into the program, but are valued as part of a program that develops future leaders in science education. The following program framework connects the leadership skills that contribute to teacher leadership with the opportunities provided by the MSSE program to develop these skills. The program framework shown in Figure 6 was developed by this researcher during program review process in 2014, and demonstrates that the MSSE program does incorporate many of the components identified through the program review and literature review (Table 3) that support teacher leadership development.

Figure 6

*Development of Skills that Contribute to Teacher Leadership through MSSE Program Leadership Skills and Attributes*



Research Procedures

This study was a sequential two level mixed-methods study, with the first level utilizing a quantitative-qualitative design. A survey was administered to MSSE program graduates. A group of graduates who completed the survey were selected to participate in the second level of the study. The second, more intensive level was a multiple case study focusing on teacher leadership and the pathways 11 individuals took to teacher leadership involvement. This level also examined the motivations and potential supports the case study individuals experienced that encouraged them to pursue leadership roles, and the perceived impact the MSSE program had in supporting the development of their leadership skills. Table 8 demonstrates the time frame over which data was collected for the two levels. The data collection procedures for each of the two study levels are described in detail below.

Table 8  
*Data Collection Procedures and Time Frame*

<b>Data Collection Method</b>	<b>Time Period</b>	<b>Dates</b>
<b>Level 1</b>		
Survey	3 weeks	April 25 <sup>th</sup> -May 9 <sup>th</sup> , 2016
<b>Level 2</b>		
Request Consent of Case Study Participants	2 weeks	May 9 <sup>th</sup> - May 20 <sup>th</sup> , 2016

Table 8 Continued

Review of Archived Documents	2 days	May 24 <sup>th</sup> -May 25 <sup>th</sup> , 2016
Interview with Teachers	2 weeks	May 30 <sup>th</sup> - June 13 <sup>th</sup> , 2016
Review of Current Resume	2 weeks	May 30 <sup>th</sup> -June 13 <sup>th</sup> , 2016
Interview with Principals	2 weeks	June 7 <sup>th</sup> - June 21 <sup>st</sup> , 2016

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Data Collection Methods

Study Level One: Survey. A survey was administered to MSSE program graduates who had graduated in the past seven years, specifically in 2009 through 2015. This survey was designed to assess the involvement of MSSE program graduates in teacher leadership roles, to identify the roles graduates filled, and to identify the pathways educators followed in order to take on leadership roles.

Instrument. The instrument utilized in this study was a survey (Appendix A). The survey used the Teacher Leadership Self-Assessment (TLSA) developed by Katzenmeyer & Katzenmeyer (2004) and the BrainSmart Survey of Teacher Leadership (BSSTL: Germuth, 2012) as templates in the development of the survey used in this research. The questions that were created based on the BrainSmart survey focused teacher perceptions

in regards to the impact the MSSE program had on supporting the development of several leadership factors or characteristics. The questions that were based on the Teacher Leadership Self-Assessment focused on the extent to which teachers perceived they completed certain leadership activities or tasks. The BrainSmart Survey (BSSTL: Germuth, 20120) reported a Cronbach's alphas to demonstrate a measure of internal consistency for each section. These were .763, .861, and .940 for leadership roles, teacher leadership, and teacher leadership practices, which indicated that BrainSmart Survey instrument reliability was acceptable. This survey was designed to assess the involvement of MSSE program graduates in teacher leadership roles, to identify the roles graduates filled, and to identify the pathways educators followed in order to take on leadership roles.

The survey was peer reviewed by colleagues in order to ensure content validity and internal validity. Several MSSE program graduates were asked to read the questions provided in the instrument and comment in regard to the completeness and the clarity of the survey. First, they were asked to determine whether the survey was complete in regards to their experience with the MSSE program, and asked to provide suggestions regarding any topics or subjects they felt had been left out. Second they were asked to read each question and respond as to what they thought the question was asking, providing a review of the question clarity. Revisions to the survey were made based on the comments made. These revisions included adding additional open response boxes following several questions and slightly re-wording two questions to improve the clarity of the questions.

The survey included both Likert-style questions and open response questions. The Likert-style questions allowed for quantification of the survey results, where as the open response portion provided more depth. The open-ended questions were included in the survey in order to identify individual leadership roles assumed by MSSE graduates, to identify the pathways used in order to fill a leadership role, and to provide depth or clarification to survey answers when needed. A brief section also collected descriptive data, including participant age, gender, year of graduation from the MSSE program, what their teaching position was, and how many years they had been teaching. Table 9 presents the survey questions in relation to the research question they addressed. The survey can be found in Appendix A.

Table 9  
*Survey Questions and Research Questions Addressed.*

Research question addressed	Survey question aim	Survey question
Research question 1:	Examined the pathways teachers used in moving into teacher leadership roles, specifically in regards to whether teachers were recruited, assigned, or volunteered.	9, 10
Research question 2	Time frame in which MSSE program graduates took on leadership roles and year of MSSE program completion	5, 8
Research question 3	Extent program participants felt MSSE program contributed to the development of and progression in their leadership skills and leadership qualities. master teaching practices and instructional leadership.	12, 14, 15

Several survey items were paired with a question that asked participants to determine the extent to which their completion of the MSSE program impacted their ability to complete the skill. These items were paired in that for each statement, two responses were requested. For example, one question asked respondents to indicate on the Likert scale to what extent they felt they demonstrated specific leadership skills, and a second question asked respondents to indicate the extent to which they felt the MSSE program contributed to the development of the skill.

Sampling Procedures. Individuals who had graduated from the MSSE program within the last seven years and had a current e-mail address on file with the MSSE office were invited via e-mail to participate in the survey level of the study. Typically, 80 to 100 students graduate the MSSE program each year. The population for the graduation years sampled included 593 individuals. Graduates from up to seven years ago were included in the study to account for the time it may take individuals following graduation from the program to transition into some form of leadership activity or role. Participants were sent a survey via e-mail through the MSSE program and were given an option to participate. This constitutes a volunteer sampling method, as individuals could decide whether or not they completed the survey. The invitation to participate in the survey included a monetary incentive, as MSSE program graduates who opted to take part in the survey were entered into a drawing to win four Amazon gift cards.

In calculating the desired sample size, a 95% confidence level and 5% confidence level was used. This indicated 233 program graduates would adequately represent the population of 593 program graduates. The survey response rate was 37%, with 220

participants responding to the survey. Of the 220 responses, 192 participants completed the survey, resulting in a completion rate of 87%. Using the 95% confidence level, the confidence interval for the actual sample size was 5.8%. This indicates that there is a 95% chance, with a 5.8% margin of error, that the responses provided by the sample represent what the whole population would select. While there are potential limitations of the representativeness study based on the response rate falling slightly under the calculated sample size required for representativeness, SurveyMonkey (Epstein, 2012) states that for online surveys in which there is no prior relationship with recipients, a response rate of between 20-30% is considered to be highly successful, and a response rate of 10-15% is a more conservative if the population hasn't been surveyed before.

Participants. Educators that had graduated from the MSSE program between 2009 and 2015 made up the population, or set of individuals under study, for this research. From this population, a sample, or a subset, was selected for inclusion in this study. The sample included all MSSE graduates who had graduated from the program from 2009 through 2015 who chose to participate in and complete the survey. The descriptive statistics of the participants who chose to participate in the survey portion of the study are shown below in Table 10. Table 10 indicates the percentages of the identified gender, grade level taught, and years of graduation from the MSSE program.

Table 10  
*Descriptive Data for Survey Participants*

Main Category	Sub-category	Percentages
Grade Level	6-8	25
	9-12	52
Gender	Female	66

Table 10 Continued

	Male	34
Year of Graduation	2009	19
	2010	16
	2011	13
	2012	14
	2013	16
	2014	9
	2015	13

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Survey Administration. A survey was sent out through the MSSE program, and was a cross sectional survey, in that it gathered data at a single point in time. A follow up e-mail was sent two weeks following the initial e-mail to encourage more MSSE program graduates to participate in the survey. The survey was administered online through Survey Monkey.

Data Analysis. The quantitative items on the survey were analyzed using descriptive statistics in order to identify the gender, age, years of experience, year of graduation, and teaching assignment of the MSSE program graduates who participated in the study. Descriptive statistics were also used to identify the pathways leaders took to move into leadership roles. The quantitative items included on the survey aimed to determine the extent to which participants perceived certain characteristics or skills in being instrumental to their assuming of leadership roles. Likert items were grouped, with the responses of one and two reported as a sum, and the responses of four and five reported as a sum. Responses for two sets of questions were analyzed through a bivariate correlation analysis. The leadership skills identified in the question served as the dependent variables and the extent of the impact on the skill due to participation in the

MSSE served as the independent variables. The R values were calculated to indicate the degree, direction, and significance of the relationship between the two variables. The  $r^2$  value was also calculated to indicate the proportion of variance that is found in the dependent variable that is explained by the values of the independent variable.

*Qualitative Items.* The open ended questions included on the survey were designed to provide more depth to the data gathered by the survey questions. For example, survey question seven asked whether participants fulfilled any leadership roles and provided a comment box to allow participants to list their roles. Many of the open-ended survey items were not a direct open-ended question, but rather provided a comment box following a quantitative item in order to allow survey participants to supply additional information. The research questions that were addressed by the qualitative survey items are shown in Table 11.

Table 11

*Research Questions Addressed by Open-Ended Survey Items*

Research Questions Addressed	Open-Ended Survey Items
1. What pathways do teachers take in moving into roles of leadership?	*9. If you responded that you do fulfill a leadership role, how did you move into the role?
1a. Were educators recruited, self-motivated, assigned a role, or were there other motivations?	*10. If you responded that you were recruited who asked or recruited you?
2. How did MSSE program graduates demonstrate progression in their involvement in leadership?	8. When did you take on the leadership role or responsibility?

Table 11 Continued

3. How did the MSSE program support contribute to leadership development or progression?	<p>*12. To what extent did your experience in the MSSE program support you in your development of the following practices?</p> <p>* 14. To what extent do you feel your participation in and completion of the MSSW program contributed to the development of the following leadership qualities?</p> <p>* 15. To extent did your participation in and completion of the MSSE program support the development of the following factors?</p>
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*Note.* Open-Ended survey items marked with an asterisks were not stand alone open-ended questions, but provided a comment box for survey participants to provide additional information.

These responses were analyzed first through coding to identify themes. Once themes were identified, common themes were compared to data collected through the quantitative survey. Several of the open-ended response questions provided confirmation for the quantitative survey responses, but did not provide additional insight into the survey question. For example, survey question nine asked participants to indicate the pathway they had taken. The question provided survey participants with a drop- down menu consisting of the following choices: appointed, recruited, or chose. Several individuals chose to submit a comment to clarify that they had applied or had been hired for a role. However, the open-ended response data confirmed the responses to the quantitative question. Survey questions 12 and 14 provided some additional information, as the following themes were identified: the MSSE program did not support the development of specific leadership skills or practices, the MSSE program supported and reinforced existing practices and qualities, and the MSSE program provided support in the development of leadership practices and qualities. The analysis of the open-ended responses for these two questions was helpful because both questions asked participants

to indicate the extent to which the program had an impact on multiple practices or qualities. The open-ended responses provided a means to analyze MSSE program graduate perception overall, rather item by item in regards to whether participants felt the program provided support.

### Study Level 2: Case Study

Because surveys are useful in gathering information, but have a very limited ability to investigate the context (Yin, 2009), case studies of 11 survey respondents were conducted as Level 2 of the study. Case studies can be helpful in explaining causal links in real-life interventions that are too complex to be addressed with a survey, describing an intervention and the context in which it occurred, and illustrating certain topics in a descriptive mode (Yin, 2009). The case study methodology utilized in this study was a multiple –case study, in which several individual cases were compiled and a single set of cross-case conclusions will be discussed.

The 11 MSSE program graduates that were selected and responded to the request for consents were included in the in-depth case studies. The 11 case studies provided descriptions of the leadership roles assumed, context of the individual’s personal and teaching situation, and background regarding how the individual became involved in each leadership role. The 11 case studies were then used to gain a greater insight into the research questions. Further, the multiple case study design allowed for an across-case analysis. The interview questions, from the interview protocol in Appendix C, are shown in Table 12 in relation to the research questions they addressed.

Table 12  
*Research Questions Addressed by Interview Items*

Research Questions Addressed	Interview Question Items
1. What pathways do teachers take in moving into roles of leadership?	2
1a. Were educators recruited, self-motivated, assigned a role?	2a, 2b
1b. Were there other motivations?	2c
2. How did MSSE program graduates demonstrate progression in their involvement in leadership?	4, 4a
3. How did the MSSE program support contribute to leadership development or progression?	5
3a What specific roles or supports did the program provide?	5a, 6a, 6b, 6c, 6d, 6e

Sampling Procedures. The 11 cases were selected using a purposive criterion sampling approach. The criteria utilized included:

1. Completion of the survey sent through the MSSE program,
2. Indication on the survey that were engaged in some form of teacher leadership,
3. Indication on the survey of their willingness to participate in further involvement,

4. Inclusion of participant contact information such as a telephone number or an e-mail address, and
5. Replied to the consent request sent by the researcher and MSSE program management.

The number of individuals that met the first four criteria was fairly high, with 93 of the 192 individuals who responded to the survey, or about 48%, meeting all four of the criteria required to be considered for involvement in the case study portion of the research. An information card was created for each individual willing to participate in the case study. The card included information gathered from the survey including the individual's gender, teaching assignment, years involved in education, year of MSSE program completion, current leadership roles, and whether they had been recruited to fill the role or had chosen to fill the role. The cards were then sorted using the constant comparative method (Strauss & Corbin, 1998), and themes within each of the information categories were identified. Factual information and themes that were considered in selecting case study participants are shown below in Table 13. The themes have been marked with an asterisks to separate them from the factual discrete categories.

Table 13  
*Factual Information and Themes Identified in Card Sort*

Factual Information and Themes*	Sub-categories
Gender	Male Female
Year graduated from program	2009 2010 20101 2012 2013 2014 2015
Grade level of teaching assignment	k-5 6-8 9-12 University
*Leadership role(s)	Mentor Provide professional development Develop curriculum Serve on team or committee Serve as Department head or chair Serve as program coordinator Instructional coach
*Pathway to role(s)	Volunteered Recruited Assigned

*Note.* Themes have been marked with asterisks to separate them from the factual discrete categories.

From these themes, individuals that represented a specific combination of the factual discrete categories and the identified themes, with a focus on their leadership role and pathway, were selected for case study participation in order to provide a representative group to include in the case study portion. Care was taken to include an

equal distribution of teaching assignments, gender, and year graduated from the MSSE program in order to have a group of case study participants that exemplified the variety of combinations of the factual discrete categories and themes. A principal for each teacher selected for the case study was also interviewed.

Participants. Twelve survey respondents were invited and 11 responded to a request for consent from the MSSE program management, agreeing to take part in the case study portion of the study. Information respondents provided through the survey is shown below in Table 14. Names have been changed to protect the identity of the case study participants.

Table 14  
*Case Study Participants*

Name	Gender	Grades Taught	Year Graduated from MSSE Program	Leadership Role	Pathway to Role
Ms. Ackerman	Female	6-8	2011	PLC, Curriculum team	Recruited, chose, and assigned
Ms. Jessen	Female	11-2	2012	Instructional and assessment coach	Applied
Ms. Akin	Female	4-5	2012	PLT, science lead, STEM fair	Assigned by principal
Mr. Tollefson	Male	6-8	2009	Mentor, Curriculum	Recruited by Principal
Ms. Hoffer	Female	9-12	2015	PLC, Professional development	Assigned by principal
Mr. Semmler	Male	9-12	2009	Data Management Coordinator	Recruited by principal

Table 14 Continued

Mr. Dirksen	Male	k-5	2013	Instruction Coach	Recruited by principal & co- worker
Ms. Stahl	Female	6-8	2015	NGSS , Grading Committee, Resource Team	Recruited by Co-worker
Mr. Nowell	Male	9-12	2015	Developed Curriculum	Recruited by co-worker
Ms. Minske	Female	University	2012	Inquiry Labs	Applied
Mr. Marshall	Male	9-12	2009	School Cluster, Mentor	Chose

Case Study Data Collection. Individuals who were selected to participate in the case study were contacted by the researcher via e-mail and separately by the MSSE program management. The e-mail sent by the researcher included an IRB consent form which asked individuals to agree to several conditions. The conditions included:

1. Submitting a current resume,
2. Participating in an interview,
3. Permitting the researcher to interview their principal or administrator, and
4. Allowing the researcher to review documents on file with the MSSE program.

The documents included a list of courses taken through the MSSE program, a resume or letters of recommendation submitted when applying to the MSSE program, and the application essay submitted to the MSSE program. The MSSE program management contacted the selected individuals as well, and requested their permission prior to allowing this researcher access to their course list and application documents. Those who responded to the request for consent sent by the MSSE program and the request for

consent by this researcher were included in the case study portion of the study. Of the 12 individuals contacted, 11 responded providing consent. One individual did not respond to decline or provide consent. Data collection included reviewing documents submitted to the MSSE program, conducting an interview via phone or skype, reviewing a current resume, and conducting an interview with an administrator of each of the case study participants.

*Document review.* Documents for each of the 11 individuals who provided consent to the MSSE program were reviewed. The MSSE program provided this researcher with a binder that included a list of courses taken and program application materials for each individual. The application materials varied by individual, as some participants had applied to the program prior to when the program required a resume. Letters of recommendation were included to provide the researcher with some background information about these individuals. The researcher traveled to the MSSE office to look at these documents and was allowed to take notes, but not to take any copies of the documents in order to ensure she was not in violation of FERPA laws. Current resumes provided directly to the researcher by case study participants were also reviewed. These documents were examined to develop a picture of each participant's involvement in teacher leadership; taking into account their involvement in leadership roles prior to and following their participation in the MSSE program, as well as their personal history, educational background, and context of their teaching position.

*Time-span of data collected through document review.* Case study data is often collected over a prolonged period of time. Due to the condensed time-frame over which

the case study portion of this study was conducted, it is important to note that the documents that were reviewed had been submitted to the MSSE program at varying times depending upon when each case study participant had applied to the program. Table 15 demonstrates the time-frame from which the reviewed documents were submitted to the MSSE program, the year the case study participants graduated from the MSSE program, and the years of teaching experience each participant had at the time of this study.

Table 15  
*Time Span of Document Review Data Collected*

Case Study Participant	Year Documents Reviewed Were Submitted	Years of Teaching Experience (Current)	Year Graduated from MSSE Program
Ackerman	2009	11	2011
Nowell	2013	9	2015
Marshall	2007	21	2009
Akin	2010	9	2014
Minske	2009	10	2011
Jessen	2008	18	2012
Dirksen	2011	15	2013
Tollefson	2002	26	2009
Stahl	2013	7	2015
Semmler	2006	14	2009
Hoffer	2014	6	2015

*Interviews of MSSE program graduates.* The MSSE program graduates who agreed to participate in the case study were contacted via e-mail in order to schedule interviews. Participants were given the option to be interviewed via telephone or through video conferencing. Nine participants opted to be interviewed via telephone and two participants opted to use Skype. Interviews were audio-taped using a digital recorder with the consent of the interviewee. Each interview was tailored to the individual and sought to gather information regarding the context of their teaching position, what leadership roles they filled, what these roles entailed, and what pathway they had followed to move into each leadership role. Participants were also asked if they could describe supports that led them to roles of leadership and were asked about the impact of the MSSE program on their leadership development and progression. The complete interview question protocol can be found in Appendix C. Interview participants were asked at the beginning of the interview to provide a brief description of the school in which they taught including the location, size, and general demographics of their school. Participants were also asked to describe their teaching assignment. This background information was collected during interviews to support the data collected through the survey and to provide a more detailed context for each case study. Teachers were then asked to describe the leadership roles they served in. This interview question served to paint a more detailed picture of the duties and responsibilities that were actually involved in each leadership role. Participants had indicated on the the survey the roles they assumed, however, the interview question served to examine what the different roles meant and what work was actually involved as it was situated in the context of each

teacher leader's school and teaching situation. Teachers were also asked to identify the pathway they followed, or what their movement into specific leadership roles looked like. Pathways to teacher leadership have been broadly classified as formal or informal, however, through the interview, the focus was on gaining a more in depth understanding of the situations, processes, and conversations involved that led to teachers taking on leadership roles. An example of an interview question is provided below.

How did you come into this (each) leadership role?

Was it (for each role) formally assigned or taken on informally?

What did the process look like?

Prior to conducting case study interviews, the interview questions were sent to ten MSSE program graduates who had completed the survey. These ten individuals were selected at random using the cards created for the card sort that was previously described. The individuals were sent the research questions via e-mail, and were asked to respond to the questions as the questions applied to their individual teacher and leadership situations. These responses were reviewed and were used to revise questions deemed unclear and to eliminate questions deemed repetitive. The interview questions that were sent via e-mail can be found in Appendix B.

*Interviews of principals or supervisors.* Following the interviews with each case study participant, this researcher requested contact information for their principal or supervisor. Principals and administrators were contacted by e-mail in order to request their voluntary participation in an interview. Interviews were conducted by telephone, and were also tape recorded with the consent of the interviewee. The interview questions

that were used in principal interviews can be found in Appendix D. Prior to scheduling interviews with principals, this researcher piloted the research questions with two local principals. In individual meetings, each of the two principals were asked to read each question, respond with their suggestions, and provide comments regarding the clarity of the question. Questions were revised based on the feedback provided by these two principals.

### Data Analysis.

*Documents.* Application materials, MSSE course lists, and current resumes were analyzed for each case study participant. The MSSE program application documents were the first case study data collected. The information collected through the review of these documents was coded using a priori codes, as the documents were reviewed to collect initial data to inform the researcher on the professional and educational background of each case study participant as described at the time of application to the MSSE program. The MSSE program application documents were also reviewed to inform the researcher as to what extent each case study participant was involved in teacher leadership roles prior to their involvement with the MSSE program. The a priori codes used included professional and educational background, teacher leadership involvement, the year an individual started the MSSE program, and the year an individual graduated from the program. Through the coding process, subcategories emerged. For example, as memos were created from the filed documents, different types of leadership involvement emerged. Individuals indicated different ways they had been involved in

teacher leadership, such as presenting at a conference or holding a specific role or title.

These were coded as such using a subcategory code.

Memos made during the review of the application documents on file in the MSSE office were reviewed a second time using the constant comparative method (Corbin & Strauss, 2008), in that the coded memos were compared to codes on the updated resumes the researcher received from each case study participant. Through the process of asking questions and making comparisons, the inductive and deductive thought process of relating subcategories to categories allowed the data to be pieced together to show a better picture of each individual's leadership involvement prior to the MSSE program and following the program (Corbin & Strauss, 2008).

All of the documents that were reviewed served as a guideline during the interview process, as having background information allowed the researcher to ask questions in a manner that elicited responses that more directly related to the individual's teaching situation and professional and educational background. Document data were also used to triangulate information that described each individual teacher's professional background, teaching situation, and leadership involvement collected through the interviews with the case study participant and one of their principals. Document data were also included in the creation of the case record, which served as the framework upon which the final case studies were developed. This is an appropriate use of the document data, as Yin (2009) states "for case studies, the most important use of documents is to corroborate and augment evidence from other sources" (p.103).

*Qualitative analysis of interviews.* Interviews of both MSSE program graduates and of their administrators were transcribed using otranscribe, a free web-based software, over a three-week time period. The completed transcript of each interview was e-mailed to the respective interviewee to allow for member checking. Any comments or changes supplied by the interviewee were then made in the transcript.

Transcripts were coded using a combination of using a priori codes and open-coding to allow themes to develop. The a priori codes focused on teacher leadership development, progression, and pathways into leadership roles and are shown in the left hand column in Table 13, below. The selection of the a priori codes that were used during the transcript analysis was driven by the conceptual framework, in that the a priori codes set out to find patterns regarding the pathways in which teachers moved into leadership roles, the motivators that involved teachers in teacher leadership, the progression of teacher leadership, and the perceived supports provided by the MSSE program in developing teacher leadership. These were included as a means to rely partially on the theoretical propositions the study was framed upon, as Yin (2009) states that “the first and most preferred strategy is to follow the theoretical propositions that led to your case study” (p.130) because “the original objectives and design of the case study presumably were based on such propositions, which in turn reflected a set of research questions, reviews of the literature, and new hypotheses or propositions” (p.130).

Through the process of coding, new codes emerged from the the data. Lincoln and Guba (1985) referred to this as the induction of the qualitative data, or an on-going process in which the researcher reconstructs the data originally gathered from a variety of

sources and the researcher uses the reconstruction process as a means to identify themes. Table 16 provides a selection of a priori codes in the left column, and the emergent codes that were established from these in the right column. A full table of the codes used and the themes identified can be found in Appendix E.

Table 16  
*A priori Codes and Emergent Codes Used in Transcript Analysis*

A priori Codes	Emergent Codes
Pathway to role	Formal Appointed Assigned Applied Stipend Invitation/nomination Informal Recruited Volunteer Unpaid Transitional Formal to informal Informal to formal
Factors that Led to Leadership Role	Internal Confidence Have skill set Personal Desire/motivation Want to be involved External Recruited Received feedback from administrator or students Took a specific class See a need in school

Table 16 Continued

Leadership Progression	<ul style="list-style-type: none"> <li>Over career</li> <li>Gain experience</li> <li>Learn skills</li> <li>Become more efficient</li> <li>Increased involvement</li> <li>Attribute to MSSE</li> <li>Increased confidence</li> <li>Increased science content</li> <li>Learned skills through capstone</li> </ul>
Motivation to Take on Role	<ul style="list-style-type: none"> <li>Personal drive</li> <li>Have experience and skills</li> <li>Enjoy task/subject</li> </ul>
MSSE Supported Leadership Development and Progression	<ul style="list-style-type: none"> <li>Neutral Factor</li> <li>Indirect Support</li> <li>Direct Support</li> </ul>
Specific Supports Provided by MSSE	<ul style="list-style-type: none"> <li>Field Courses <ul style="list-style-type: none"> <li>Data collection</li> <li>Increased science content knowledge</li> </ul> </li> <li>Education Courses <ul style="list-style-type: none"> <li>Increased educational content knowledge</li> <li>Instructional methods and techniques</li> <li>Learn how to assess and evaluate</li> </ul> </li> <li>Capstone <ul style="list-style-type: none"> <li>Provided opportunity to reflect</li> <li>Evaluate learning</li> <li>Learn how to conduct action research</li> <li>Learn how to use data</li> </ul> </li> </ul>

The process of data analysis in regards to the interview data was a multi-step process. First, individual cases were coded using a priori codes. As new categories emerged, individual cases were re-coded, using the constant comparative method (Strauss & Corbin, 1998). The constant comparison process involved comparing similar codes

from one transcript to another, identifying new categories, delineating categories, and connecting categories (Boeije, 2002). The analysis of the coding process utilized two processes, fragmenting and connecting, as described by Boeije (2002).

During the fragmenting process of the interview analysis, emphasis was placed on separating themes that emerged in interviews that were relevant to the research questions. In this step, the transcripts were coded using predominantly a priori codes referring to teacher pathways, leadership roles, and supports offered by the MSSE program. In using the constant comparative method, codes were compared between teacher interviews, between principal interviews, and between respective teacher/principal dyads. The coding units were selected, as Boeije (2002) suggested, in a way that enabled questions to be answered effectively and efficiently. The cycle of comparing and reflecting on the assigned codes used was repeated several times, as a means to increase the validity, as “comparisons that are highly regarded increase the internal validity of the findings” (Boeije, 2002, p. 393). During the comparative process, variations in interview responses were identified, described and conceptualized, and through the process of comparison, commonalities in reasons, perspectives, and attitudes were sought out. A three step process, similar to the five step process described by Boeije (2002), was used and is described as follows:

Step 1. Internal Comparison: Fragments were given labels and individual interviews were studied for other fragments that should be coded with the same code. Some pre-selected codes were used, based on the conceptual and theoretical frameworks that guided this research, as Yin (2009) states that “the first and most preferred strategy is

to follow the theoretical propositions that led to your case study” (p. 130). Transcripts were coded using the set of pre-selected codes as well as allowing for emerging, inductive codes. These fragments were then compared further within one transcript to determine commonalities and differences. For example, any time the teacher made reference to a task or responsibility they were involved in outside of their classroom, it was identified as the leadership role. Through the internal comparison step, transcripts were analyzed to ensure that all of the comments within one interview were coded using consistent codes.

Step 2. Same Group Comparison: During the same-group comparison, teacher interview transcripts were compared to other teacher interview transcripts. The first round of comparison involved checking for consistent use of codes. For example, the term informal pathway was used in all of the occasions that the individual indicated they had moved into a leadership role through an informal way, such as volunteering or through an informal conversation. The second round of comparison between teacher interviews served to fragments a priori codes. For example, an a priori code that was initially used was school context. This code was used to label the school’s size, geographic location, whether the school was public or private, the grade level of students served, and comments about the student body served. These codes were compared from different interviews within the same group, and sub-categories emerged. Teacher interviews were re-coded to represent the fragmented codes as listed above. By the end of this step, a fairly comprehensive list of codes emerged, as some codes were further defined and more specific codes were created.

Step 3. Different Group Comparison: In this step, the teacher transcript was compared with the principal transcript. In comparing coding from two different groups in regard to the same phenomenon, this step served as a measure of validation (Boeije, 2002). The information from the administrator enriched and supported the information provided by the teacher and confirmed what teachers said about their leadership roles and pathways. Some additional codes were created in order to differentiate between traits or characteristics that had been self identified, and those that had been identified by an administrator. This step served to finalize the coding system used, which can be seen in Appendix E. Following the final step, all transcripts were reviewed one additional time to edit codes that were no longer specific enough. Through the process of using these three steps, descriptions and themes were identified (Creswell, 2008). A sample of the codes used, code definitions used, and themes that were identified are shown below in Table 17.

Table 17  
*Themes and Codes Used to Analyze Case Study Interviews*

Themes	Codes	Definitions	Research Question
Leadership Role	LR1. Current LR2. Former LR3. Title LR4. Actual tasks	LR1. The leadership roles the teacher currently fills. LR2. The leadership roles the teacher has filled in the past. LR3. The name given to the leadership role. LR4. The responsibilities and duties involved in the leadership role.	1, 2, 3

Table 17 Continued

Pathway to Role	<p>PW1. Formal</p> <p>PW1a. Applied</p> <p>PW1b. Appointed/Invited (formal recruitment)</p> <p>PW2. Informal</p> <p>PW2a. Recruited</p> <p>PW2b. word of mouth</p> <p>PW2c. Volunteered</p> <p>PW2d. Advocated</p> <p>PW3. Transitional</p> <p>PW4. Monetary aspect</p> <p>PW4a. stipend</p> <p>PW4b. voluntary</p>	<p>PW1. Teacher moves into role through a formal channel.</p> <p>PW1a. teacher formally applies</p> <p>PW1b. teacher is appointed, nominated, or invited to participate in formal manner</p> <p>PW2. Teacher moves into role through an informal channel.</p> <p>PW2a. Teacher is informally recruited.</p> <p>PW2b. Teacher ends up serving in role due to word of mouth and others seeking out their expertise.</p> <p>PW2c. Teacher volunteers to fill role.</p> <p>PW2d. Teacher advocates for a role that doesn't exist.</p> <p>PW3. Teacher starts in a role that either turns from informal to formal, or turns into another role.</p> <p>PW4. Indicates whether teacher is compensated for the work done in the leadership role.</p> <p>PW4a. Teacher receives stipend or supplemental income for serving in role.</p> <p>PW4b. Teacher does not receive a stipend or supplemental income for serving in role.</p>	1, 2, 3
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Table 17 Continued

Motivation to take on leadership roles	M1. Enjoy specific task/subject M2. Involvement/make impact/make decisions/drive change M3. Experience and qualifications M4. Positive feedback M5. Best for students	M1. Teacher enjoys the tasks involved in the role. M2. Teacher wants to be involved in decision making and make an impact M3. Teacher is qualified to fill the leadership role M4. Teacher has received positive feedback about leadership tasks M5. Teacher wants what is best for students and student instruction	1
Leadership Progression MSSE Contributed to	LPM1. Increased confidence LPM2. More content knowledge LPM2a. Exposure to field courses LPM3. Opportunity to learn from other science teachers	LPM1. MSSE contributed to leadership progression by contributing to an increase in confidence. LPM2. MSSE contributed to leadership progression by contributing to an increase in content knowledge LPM2a. MSSE contributed to leadership progression by contributing to content knowledge through field courses LPM3. MSSE contributed to leadership progression by providing a means to discuss science education with other educators	2, 3

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Table 17 Continued

MSSE & Support Leadership Development	LDM1. Reflective LDM2. Measure & evaluate learning LDM3. Instructional techniques LDM4. Increased content knowledge LDM5. Increased confidence	LDM1. The MSSE program supported leadership development by helping teachers reflect on their own practices. LDM2. The MSSE program supported leadership development by supporting teachers as they learned to measure and evaluate learning. LDM3. The MSSE program supported leadership development through an increased knowledge of instructional techniques. LDM4. The MSSE program supported leadership development through an increase in content knowledge. LDM5. The MSSE program supported leadership development by contributing to teacher's confidence.	3
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*Creation of case studies.* Multiple sources of evidence were collected for each case study as described above. In order to increase the reliability of all of the case studies, a database, which would allow other investigators to review the evidence directly was created, while maintaining the anonymity of the individuals included in the case study analysis (Yin, 2009). This aimed to provide raw evidence as well as a chain of evidence that served to support the written case study narratives. The connecting process

was used to create the case study narratives. Each interview as a whole and the supporting pieces for each case were connected (Boeije, 2002). This process was utilized to create the case study for each individual.

First, a document review of archived documents was completed by this researcher, as described in an earlier section, for each case study participant. Each of the documents were reviewed, coded, and notes were taken. Prior leadership involvement cited on individuals' resumes or in their application letters to the MSSE program were of particular interest as they provided a snapshot of the participant and their leadership involvement at that point in time. This data was helpful in guiding the interview and also served as a means to confirm information that was provided in the participant interviews and interviews with the participant's principal. Second, individuals were asked to submitted a new or recent resume, which allowed for a comparative analysis, in which current roles were checked against previously listed roles, and against information supplied in interviews. This comparison was done to help create the case study narrative (Patton, 2002), which is inclusive of all of the information gathered for each case and is done in order to ensure each case is represented. Third, participants were interviewed using Skype or via telephone. All of the individual interviews were audio recorded and were transcribed by this researcher. Finally, the supervisor or a principal of each individual was interviewed via telephone. Each interview was audio recorded and was transcribed by this researcher.

The transcriptions of each teacher and principal interview were sent to the respective participant via e-mail prior to being coded. Individuals were asked to respond

to the e-mail with any corrections or clarifications they felt should be made on the provided transcript. This served as a means of member checking and ensured that responses had been correctly heard and had been accurately represented. Transcripts were then coded using a combination of deductive or pre-selected codes and inductive codes that were created using the constant comparative method, as previously discussed. Transcripts were coded on paper, and re-coded to ensure accuracy and consistency in coding. A colleague of the researcher was trained using the final set of codes on several of the transcripts, coding a sample set of teacher and administrator interview transcripts. After receiving training on using the coding scheme, the colleague coded several case studies. Following the coding process, codes that did not match were discussed. An inter-rater reliability was determined, and was 95%.

Second, a case record was created for each of the 11 MSSE program graduates included in the case study portion of the study. Organizing raw data into a case record is an important step, as Patton (2002) states that “the case study record includes all the major information that will be used in doing the final case analysis and writing the case study” (p. 449). Data from the document analyzed in the document review, individual surveys, individual interviews, a current resume, and interviews of administrators were included in creating the case record. In order to provide a chain of evidence, the data source of each piece of data included in the case record was indicated.

Following the creation of the case reports, actual case study narratives were written. All names and other identifying information were changed in order to protect the identify of the case study participants. Attention was given to ensure the final case study

provided an accurate and descriptive view of each participant's leadership involvement, pathways taken to transition into roles of leadership, and to demonstrate their perceptions on what supported their leadership development. Final case studies and associated coded transcripts were sent to members of the graduate committee as a reliability measure.

*Cross case analysis.* Following the creation of each individual case, the cross case analysis was conducted. Similar codes in individual transcripts were grouped to identify patterns and to answer research questions. Codes from MSSE program graduate transcripts were analyzed along with codes from the administrator of each individual. Several broad categories were identified, such the context of the school and teaching assignment, the leadership roles the individual filled, the tasks or responsibilities the role entailed, and the pathways, or how the individual transitioned into each leadership role. Sub-categories emerged as cases were compared and codes were modified. Codes were grouped from all 11 cases by common themes and analyzed further to identify patterns and answer the research questions posed.

### Trustworthiness

This section will address how this researcher considered the four criteria identified by Guba (1981) that should be considered by qualitative researchers in pursuit of a trustworthy study. The four criteria include credibility, transferability, dependability, and confirmability. Credibility depends on three distinct but related inquiry elements: using rigorous methods for doing fieldwork that yield high-quality data, the credibility of the researcher, and a fundamental appreciation of naturalistic inquiry, qualitative

methods, inductive analysis, and purposeful sampling. Patton (2002) states that rigorous techniques such as observing, interviewing, and document gathering increase the quality of data collection during the fieldwork. Data was collected for this study in an attempt to address this element using surveys, participant and school principal interviews, and a review of documents such as MSSE program applications and participant resumes. Patton (2002) also emphasized that the quality of the information gathered is dependent on the interviewer and recommended using open-ended questions in order to allow the person being interviewed to respond in a manner that expresses their own words and personal perspectives. Open ended questions were used in this study in both the survey as well as the participant and principal interviews. Patton also referenced the issue of researcher bias, and suggested discussing one's predispositions, making potential biases known, and acknowledging one's orientation with a specific theory in order to help counter this suspicion. The researcher of this study aimed to provide information that may lead to potential bias, including her own participation as a study in the MSSE program.

Credibility issues include those of internal validity, in which the researcher seeks to ensure the study measures what it intends to measure. Credibility was addressed in regards to the survey instrument and interview questions utilized in this study in that the researcher requested a peer-review of instruments. Graduates from the MSSE program who had participated in the program with the researcher of this study were consulted regarding the survey and interview questions in order to ensure the instruments indeed collected the data they intended to collect. Triangulation is another technique that

addresses credibility, in that triangulation utilizes multiple sources for data collection in order to reduce the risk of reflecting the limitations of a specific source or method. Triangulation was used in this study, as data was collected from multiple sources, including a survey, teacher and principal interviews, and data from the review of documents. Participants in this study were also given the option to refuse to participate, ensuring that data collection involved only those who were genuinely willing to take part of the study and were willing to offer data freely (Shenton, 2004).

The extent to which the results of this study can be transferred or generalized to other contexts or settings is dependent upon the nature of the contexts or settings it is to be transferred to. If practitioners believe their context or setting to be similar to those discussed in the study, they may relate the findings (Bassey, 1981). The context of this study focused on identifying how MSSE program graduates move into roles of leadership, and it is left to the reader to determine whether or not they can transfer the results to the context of their interest or not. Dependability was addressed by examining the homogeneity of the MSSE program over the past several years. Efforts were made to identify whether any changes in the MSSE program occurred during the years that study participants were enrolled in the MSSE program, as any program changes could impact the approach taken in conducting the study. This study also attempted to report the following processes used in this study in detail: describing the research design and its implementation, the methods involved in data collection, and the reflection and evaluation of the research itself (Shenton, 2004). Providing these descriptions allow a future researcher to repeat the work (Shenton, 2004). Confirmability suggests taking

steps to ensure that the work's findings are the result of the experiences of the participants, rather than the preferences of the researcher. Triangulation aids in ensuring confirmability, as it aids in reducing researcher bias. Detailed descriptions of the methods used also allow the reader to determine the extent to which the data emerging from the study can be accepted (Shenton, 2004). Triangulation and detailed descriptions of the methods were utilized by this researcher in the current study to ensure confirmability.

#### Researcher's Position

It is important to note that the researcher had a bias in this study. This researcher had previous involvement with the MSSE program in that she was a graduate of the program. The nature of this bias is that the researcher had a positive experience and felt that her involvement in the MSSE program was instrumental in the development of her teacher leadership skills. The researcher felt that the program contributed to the development of her science content knowledge, pedagogical knowledge, and ability to effectively use action research, and felt that the addition of the knowledge and skills increased her ability as an educator and her confidence in helping other educators.

In addition, the researcher's graduate course of study included the following MSSE courses: MSSE 580 "Web Tools for Teachers", and EDCI 518 "Master Teaching Strategies. These courses supported the researcher in her understanding of instructional tools and methods that could be utilized in the classroom, and supported her development as a teacher leader as both courses provided her with instructional strategies and tools that

could be shared with her colleagues. The researcher felt that her involvement in the MSSE program contributed to her knowledge and understanding of the topic this study focused on, and should not be viewed as a distraction, but should serve to enhance this study.

In order to mitigate this bias, this researcher took several steps to ensure validity and reliability. Multiple data sources were used, allowing for triangulation. Member checking was also utilized, as interview transcripts were reviewed by those who participated in interviews. Inter-rater reliability was also established with a 95% proportion agreement in codes for a sub-set of interview transcripts. Several transcripts and the cases studies were reviewed by members of the graduate committee. Case study reports were created in a manner that provided an audit trail which was maintained throughout data analysis (Janesick 2000, Creswell 2003). Moreover, all findings were authenticated by the research participants themselves (Janesick 2000). Furthermore, detailed descriptions of teachers' experiences and their meanings were featured in the final case study (Miles & Huberman, 1994; Laverty 2003).

### Summary of Methodology

The methodology of this study utilized a sequential two level mixed-methods approach. The first level utilized a survey. Individuals who completed the survey were then selected to participate in the the second level of the study, which utilized a review of documents and interviews. Level one collected quantitative data through Likert items on the survey and collected qualitative data through open-items on the survey distributed to

a sample of MSSE program graduates. The second level of study collected qualitative data through interviews of MSSE program graduates, interviews of administrators, and through a review of documents such as resumes and MSSE program applications.

## CHAPTER FOUR - RESULTS

Introduction

The purpose of this chapter is to present the quantitative and qualitative results of the survey, to provide descriptive narratives of the 11 MSSE program graduates in the form of case studies, and to present the cross-case analysis. The first level of the study utilized a survey. Quantitative and qualitative data were obtained. The second level of the study utilized case studies. Qualitative data from MSSE program graduates were gathered from individual interviews, interviews with principals, and e-mail correspondence

Analysis of the data was made specifically in regard to the constructs of the pathways teacher take to move into leadership, as situated in the distributed leadership theory, and the constructs that support leadership development as identified through the literature review. Results are discussed in two separate sections, with the first section providing an analysis of the surveys that were administered. The second section focuses on reporting the results of the qualitative data, including the individual case studies. Students' perceptions of their leadership roles, development and progression of leadership skills, leadership pathways, and the relation of leadership development and progression to the MSSE program have been incorporated throughout the qualitative data reporting sections. Further, additional themes that emerged from the data were identified and reported. Names used in the case studies have been changed and identifying

characteristics of the teachers such as city, state, and school have been eliminated or altered.

### Survey Results

This section provides the results for the demographic characteristics of the MSSE graduates who completed the survey. Descriptive statistics of the MSSE graduate responses to the survey questions were analyzed. The survey aimed to answer the following research questions:

1a) Were educators recruited, self-motivated, assigned a role? 2) Did MSSE program graduates demonstrate progression in their involvement in leadership? 3) Did MSSE program graduates perceive that the MSSE program supported or contributed to a progression in their leadership involvement? 3a) If so, what specific roles or supports did the program provide? and 3b) Is there a relationship between MSSE program graduates' perception of the extent to which specific factors encouraged them to take on leadership roles and the extent to which they perceived the MSSE program supported the development of these factors?

### Quantitative Data

*Participant Demographics and Leadership Involvement.* The participants identified their gender, current teaching position, their years of involvement in education, the year they graduated from the MSSE program, and what age they were upon

graduation of the MSSE program. The results collected through the survey are reported below in Table 18.

Table 18

*Survey Participants*

Descriptive Category	Response	Percentages	N
Teacher gender	Male	33	64
	Female	66	126
Years of experience	0-5	5	9
	6-10	28	54
	11- 15	24	46
	16-20	17	33
	21-25	13	25
	26-30	6	11
	30+	7	13
Teaching position	9-12	52	87
	6-8	25	42
	Pre K-5	7	11
	informal science educator	3	5
	college or adults	6	10
Year graduated MSSE	2015	12	23
	2014	9	16
	2013	16	28
	2012	14	25
	2011	13	23
	2010	16	29
	2009	19	34
Age upon graduation of MSSE program	26-30	26	48
	31-35	17	31
	36-40	15	27
	41-45	15	28
	46-50	11	21
	51-55	11	20
	56-60+	4	7

Participants were also asked to indicate whether they fulfilled any formal or informal leadership roles. In response to this question, 78.7% (n=148) responded yes, 17% (n=32) responded no, and 4.3% (n=8) responded unsure. Following the question, individuals were asked to supply what leadership role(s) they filled in a comment box provided below the question. These responses (n= 157) were analyzed and leadership role categories were determined. The number of participants who listed each category are reported. Because many participants listed two or more leadership roles they were involved in, and some participants provided reasons they were not currently in a leadership role, Table 19 aims to provide glimpse of what roles were most often cited by MSSE graduates but does not include percentages.

Table 19  
*Leadership Roles Taken on by MSSE Program Graduates*

Leadership Role Categories	Number of Participants that Listed role
Serve on a team or committee	47
Department head or chair	33
Serve as a coordinator or director	32
Mentor other teachers (including student teachers, and teacher assistants)	25
Level or subject head	22
Help write or select curriculum	20
Serve as a union representative, offices, or help with bargaining	15
Fill an extracurricular role	11

Table 19 Continued

Serve as a supervisor or director	9
Provide professional development	6
Serve as an instructional coach	5

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Several individuals reported serving on a team or committee, and there was a large variety in the teams or committees listed. These include, but are not limited to instructional committees, response to intervention teams, professional learning community teams, leadership teams, and grading committees. There was a wide variety of coordinator roles supplied by survey participants as well. Some of these roles involved coordination of STEM programs, sustainability programs, assessment or data collection, science fairs, outdoor studies, and service learning programs.

*Research Question 1.* Participants were also asked to select the pathway, or how they moved into the leadership role(s) they had listed in order to address research question one. The pathways choices provided on the survey were: assigned by principal, recruited to fill role, or chose to fill role. Table 20 indicates the frequencies of each pathways as reported by survey participants (n=144). Survey participants indicated that they most likely chose to fill a role or were recruited to fill a role, with the responses for those two choices being reported with almost the same frequency.

Table 20  
*Pathways to Leadership Role*

Pathway	Percentage of Response	N
Chose to fill role	42	61
Recruited to fill role	38	54
Assigned to fill role	20	29

Of the participants who responded that they had been recruited to fill a role, there was a follow up question which asked these individuals to indicate who they had been recruited by. Survey options included: principal, co-worker, teacher/colleague, student, or parent. The frequencies of these responses are shown in Table 21, and demonstrate that participants were recruited most frequently by their principal.

Table 21  
*Frequencies by Type of Person that Recruited Teacher to Leadership Role (n= 86)*

Individual reported as doing the recruiting	Frequency	n
Principal	63%	54
Co-worker	20%	17
Colleague/teacher	17%	15
Student	0%	0
Parent	0%	0

*Research Question 2.* In order to address research question 2, how did MSSE program graduates demonstrate an increased progression in their leadership involvement,

the survey asked graduates to indicate both the year they had graduated from the MSSE program and the year they had taken leadership roles on. Data gathered from these two questions was compared for each individual who answered both questions. Many program participants indicated they had taken on additional roles following their involvement in the MSSE program. However, a roughly equal number of participants indicated that they had been in leadership roles prior to their involvement with the program. Hence, it was determined that these two survey questions did not provide direct evidence that teachers had progressed in their leadership. However, these questions indicated that if teachers had not taken on additional roles following their involvement in the MSSE program, it was because they had already been involved in leadership roles.

Several questions on the survey utilized a Likert scale format, allowing for the quantification of responses. The results of Table 22 help better indicate the professional practices and behaviors survey participants are engaged in or display and to what frequency. These results are reported in Table 22.

Table 22 indicated that a high percentage of survey participants can be considered reflective, approachable, willing to share with their colleagues, persistent in the pursuit of student success, and proactive in identifying problems and seeking solutions. These responses indicated that a large number of MSSE program graduates employ behaviors that have been associated with teacher leadership. However, more data is needed in order to better address research question two, which focused on demonstrating leadership progression.

*Research Question 3.* For survey question 11, MSSE program graduates were asked to determine the extent to which each of five factors encouraged them to take on a leadership role. The factors were:

- 1) competency as a science educator,
- 2) having strong science content knowledge,
- 3) having confidence using a variety of instructional strategies,
- 4) being comfortable using technology, and
- 5) having knowledge and experience collecting and using data to drive instruction.

Table 22

*Frequency Statement Was Descriptive of Teacher Behavior*

	N/A	1	2	3	4	5
1. I reflect on what I do well and also how I can improve as a classroom teacher. (n=190)	2% (4)	0% (0)	0% (0)	3% (5)	35% (67)	60% (114)
2. I understand how my strengths impact the role I serve as a leader in my school. (n=191)	4% (8)	0% (0)	1% (2)	9% (18)	41% (79)	44% (84)
3. I seek feedback on how I might improve in my work setting. (n=189)	1% (1)	0% (0)	2% (4)	23% (44)	40% (75)	34% (65)
4. I lead others in accomplishing tasks. (n=190)	2% (4)	.5% (1)	2% (4)	25% (47)	48% (92)	22% (42)
5. I work toward improving the culture of the school. (n=190)	3% (6)	0% (0)	3% (5)	13% (25)	37% (71)	44% (83)
6. I involve colleagues when planning for change. (n= 190)	3% (5)	0% (0)	2% (4)	17% (33)	45% (86)	33% (62)
7. I use research-based instructional strategies. (n=190)	2% (4)	.5% (1)	3% (6)	18% (34)	39% (74)	38% (71)
8. I am approachable and open to sharing with colleagues. (n=190)	1% (2)	0% (0)	0% (0)	4% (8)	27% (52)	67% (128)
9. I persist to assure the success of all students. (n=190)	3% (5)	0% (0)	1% (2)	6% (12)	32% (61)	58% (110)
10. I am proactive in identifying problems and working to solve them. (n=190)	1% (2)	0% (0)	1% (2)	8% (15)	43% (82)	47% (89)
11. I work side-by-side with colleagues, parents, and/or others to make improvements in the school or district. (n= 190)	5% (9)	0% (5)	3% (5)	16% (31)	39% (75)	37% (70)
12. I seek out pertinent information from many sources before making decisions or taking action. (n=190)	2% (4)	0% (0)	3% (5)	17% (33)	38% (73)	39% (75)

On the survey, each factor could be rated on a one to five scale, with one indicating the factor had not encouraged the participant at all and with five indicating the factor had encouraged them to a great extent. Responses were analyzed, and were sometimes reported by grouping all responses of one and two together and grouping all of the four and five responses together. Results for question 11 are found in Table 23.

Table 23  
*Extent Factors Encouraged Teachers to Take on Leadership Role*

Factors	Response				
	1 not at all	2	3	4	5 to a great extent
Competency as a Science Educator (n=167)	12% (20)	2% (4)	78% (13)	35% (58)	43% (72)
Strong Science Content Knowledge (n= 165)	13% (21)	4% (6)	13% (21)	39% (64)	32% (53)
Confident Using Variety of Instructional Strategies (n= 165)	5% (8)	2% (4)	7% (12)	41% (67)	45% (74)
Comfortable Using Technology (n= 165)	6% (10)	6% (10)	15% (24)	38% (62)	36% (59)
Knowledge and Experience in Data Collection (n= 165)	7% (11)	7% (11)	21% (35)	35% (57)	31% (51)

A large percentage of respondents identified having confidence in using a variety of instructional strategies as a factor that encouraged them to take on roles of leadership, with 85 percent of survey respondents selecting a four or five. Participants also felt that identifying themselves as a competent science teacher was a factor that encouraged them to take on leadership roles, with 77 percent selecting a four or five on the Likert scale.

Participants were asked in survey question 15 to identify the extent to which participation in and completion of the MSSE program supported the development of the same factors listed in question 11, which were:

- 1) competency as a science educator,
- 2) having strong science content knowledge,
- 3) having confidence using a variety of instructional strategies,
- 4) being comfortable using technology, and
- 5) having knowledge and experience collecting and using data to drive instruction.

The results are shown in Table 24.

Table 24  
*Extent MSSE Program Participants Perceived the Program Supported the Development of Leadership Factors (n=191)*

Factors	Response				
	1 no impact	2 very little impact	3 neutral	4 had impact or impact to a great extent	5 impact to a great extent
Increased Competency as a Science Educator	1% (2)	1% (2)	7% (13)	31% (59)	60% (115)
Having Strong Science Content knowledge	.5% (1)	4% (7)	14% (27)	35% (67)	47% (89)

Table 24 Continued

Increased Confidence Using Technology	9% (17)	12% (23)	25% (47)	35% (66)	20% (38)
Confidence in Collecting and Using Data	.5% (1)	6% (11)	10% (19)	43% (82)	41% (78)

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Responses from question 15 helped to answer research question 3, in demonstrating that a high number of MSSE program graduates indicated that the MSSE program had an impact on the development of these factors for the following traits: competency, strong science content knowledge, confidence using instructional strategies, and confidence in collecting and using data. This aided in answering research question 3a, which focused on identifying the specific roles or supports that the program provided. Survey results indicated that a very high percent (91%) of survey respondents reported that they perceived that their involvement in the MSSE program resulted in an increased competency as science educator. Participant response indicated that a high number of individuals (85%) felt their participation in the MSSE program supported the development of increased confidence in using instructional strategies. Survey participants also reported feeling very strongly in regards to the impact the MSSE program had on their confidence in collecting and using data to drive instruction, with 84% responding that the program had a positive impact on their development of this factor. Of the five traits participants were asked to respond to, the only trait that had less than 80% of participants indicating that the program supported the development of the trait was increased confidence in using technology, with 54% indicating the program did support their development.

Question 14 asked survey participants to respond to a question regarding the extent to which their involvement in the MSSE program contributed to a set of four leadership qualities. The responses from question 14 were also used to address question 3 and 3a in examining whether the MSSE program supported leadership development and progress and attempting to identify if the program provided specific supports. The qualities included in this question were:

- 1) Leading change: Uses effective strategies to facilitate positive change
- 2) Having self awareness: Has an accurate picture of one's self in terms of strength, values, philosophy, and behaviors,
- 3) Aiming for continuous improvement: Demonstrates commitment to reaching higher standards and readiness to take action to improve, and
- 4) Possessing instructional proficiency: Possesses and uses professional knowledge and skills in providing the most effective learning opportunities for students and adults

These four characteristics were selected as a means to identify the extent to which participants felt that the development of specific leadership qualities was supported by the MSSE program. The results from question 14 are reported in Table 25.

Table 25  
*Extent MSSE Program Graduates Perceived the Program Supported the Development of Leadership Qualities (n=190)*

Leadership Qualities	Response				
	1	2	3	4	5
Uses effective strategies to facilitate positive change	3% (6)	5% (9)	29% (56)	39% (75)	23% (44)
Has an accurate picture of one's self in terms of strength, values, philosophy, and behaviors	2% (3)	3% (6)	14% (27)	41% (78)	40% (76)
Demonstrates commitment to reaching higher standards and readiness to take action to improve	1% (2)	2% (3)	14% (26)	35% (66)	49% (93)
Possesses and uses professional knowledge and skills in providing the most effective learning opportunities for students and adults	2% (3)	3% (5)	14% (27)	39% (73)	43% (80)

The results from question 14 showed that over 80% of survey participants indicated that the MSSE program impacted their ability to self evaluate their strengths, values, philosophy, and behaviors to a great extent (weighted average score 4.15). Similarly, 84% of individuals felt their involvement in the MSSE program contributed to their commitment to reaching higher standards and taking actions to do so (weighted average score 4.29). And finally, 81% of individuals reported that their involvement in the MSSE program contributed to a high extent to the possession and use of professional knowledge and skills that allow them to provide effective learning opportunities (weighted average score, 4.18). Participants were less inclined to indicate that the MSSE

program supported the development of strategies used to facilitate positive change, with 63% of participants responding that the program had an impact and 30% of participants responding that the program had a neutral impact.

Question 12 asked survey participants to respond in a similar fashion in order to determine the extent to which participants felt the MSSE program supported their development. This question used a Likert scale as well, and asked participants to rate sixteen items based on a one to five scale in which 1 indicated that the MSSE program supported their development very little, and 5 indicated that the MSSE program supported their development to a great extent. The 16 items included in this question were selected for inclusion as they were recognized as factors or characteristics displayed by teacher leaders. The results from the analysis of question 12 are shown in Table 26.

Table 26  
*Extent to Which MSSE Program Participants Perceived Program as Supporting the Development of Leadership Practices.*

	1	2	3	4	5	N/A
1. Utilize technology to enhance student engagement. (n=190)	8% (16)	13% (25)	24% (45)	28% (53)	26% (49)	2% (4)
2. Model and assist teacher in the integration of technology. (n=190)	11% (20)	18% (35)	25% (48)	22% (41)	21% (39)	5% (9)
3. Apply knowledge and strategies of adult learning theories across leadership practices. (n=190)	10% (18)	5% (10)	20% (38)	32% (61)	24% (46)	10% (19)
4. Stay current with research regarding best practices. (n=190)	5% (9)	4% (7)	17% (32)	32% (60)	41% (78)	2% (4)
5. Share current research with the school community. (n=190)	5% (9)	8% (16)	23% (43)	31% (58)	30% (56)	4% (8)
6. Teach and/or model changes in teacher practices. (n= 187)	3% (6)	5% (9)	10% (19)	35% (66)	44% (82)	3% (6)

Table 26 Continued

7. Design, facilitate, and implement professional development aligned to state standards. (n=190)	9% (18)	10% (19)	16% (31)	25% (48)	26% (49)	14% (26)
8. Work with others to create an environment that encourages change. (n=190)	4% (8)	8% (15)	19% (36)	29% (55)	33% (62)	7% (14)
9. Lead others in prioritizing, mapping, and monitoring the implementation of the curriculum. (n=190)	7% (13)	9% (17)	17% (33)	34% (65)	26% (50)	6% (12)
10. Model and articulate exemplary instructional practices. ((n=190)	4% (7)	5% (9)	16% (31)	33% (62)	38% (72)	5% (10)
11. Promote and encourage teachers in developing higher order questions, thoughtful discourse, and critical thinking in the classroom. (n= 189)	4% (7)	6% (11)	15% (29)	28% (52)	39% (74)	9% (17)
12. Guide teachers in the in-depth understanding of lesson planning and delivery of content in clear and meaningful ways. (n=190)	7% (13)	11% (20)	17% (32)	31% (59)	26% (50)	8% (16)
13. Facilitate collection, analysis, use, and interpretation of assessment data. (n=190)	8% (15)	6% (12)	17% (33)	32% (61)	27% (51)	11% (20)
14. Conduct and engage others in appropriate research to improve educational outcomes. (n=190)	8% (15)	11% (21)	19% (37)	28% (53)	24% (45)	11% (20)
15. Articulate and advocate the rationale and processes of school improvement. (n=190)	9% (18)	12% (23)	21% (40)	28% (53)	22% (41)	9% (17)
16. Facilitate open dialogue of ideas and information that support student learning and the change of teaching and learning practices. (n=190)	3% (5)	7% (14)	16% (31)	36% (68)	33% (62)	5% (10)

Question 12 focused more on teacher leadership activities and practices, and through the responses, was able to help answer research question 3b, in identifying which

activities MSSE program participants felt the program supported their development. Since question 12 included many statements, only those where over 65% of the survey respondents felt the MSSE program supported their development of the practice will be discussed. However, the program could use the data to make program changes if so desired.

Statement six identified that 79 percent of survey participants felt that MSSE program contributed or contributed to a great degree to the development in the practice of teaching and modeling teacher practices that are necessary for improvement in student learning. Question 12, statement four also identified that 72 percent of survey participants felt the MSSE contributed or contributed to a great degree to development of the practice of staying current with research regarding best practices and features of professional learning. Seventy percent of survey participants, as reported in statement ten, felt the MSSE contributed or contributed to a great degree the development of modeling and articulating exemplary instructional practices and strategies based on current research. Survey participants' response to statement 16, facilitating open dialogue of ideas and information that support student achievement goals and the change of teaching and learning practices, indicated that 68 percent of survey participants felt the MSSE contributed or contributed to a great extent in their development of this practice. Sixty-seven percent of survey participants felt that the MSSE contributed or contributed to a great degree in the development of statement 11, promoting and encouraging teachers in developing higher order questions, thoughtful discourse, and critical thinking in the classroom.

Two questions on the survey were analyzed using statistical analyses. The variables were normally distributed but the assumption of linearity was violated. Therefore, Spearman’s Rho, a nonparametric measure of correlations was computed to examine the inter-correlations of the variables. The first set of factors referred to question 11, which asked participants to indicate the extent to which the factor encouraged them to take on roles of leadership. The second set of factors referred to question 15, which asked participants to indicate to what extent the MSSE program supported the development of the factor. Table 27 shows the factors that were compared for correlation.

Table 27  
*Factors that Were Correlated*

1 <sup>st</sup> Set of Factors:	2 <sup>nd</sup> Set of Factors
Competency as a Science Educator	MSSE Supported the Development of Competency as a Science Educator
Knowledge and Experience in Collecting and Using Data to Drive Instruction	MSSE Supported the Development of Confidence Collecting and Using Data to Drive Instruction
Having Strong Science Content Knowledge Foundation	MSSE Supported the Development of Strong Science Content Knowledge
Confidence in Using a Variety of Instructional Strategies	MSSE Supported the Development of Confidence in Using a Variety of Instructional Strategies
Comfortable with Using Technology	MSSE Supported the Development of Increased Comfortability Using Technology

In order to answer research question 3b, a Spearman Rho correlation was used to determine if there was a significant association between the extent to which participants

felt their competency as a science educator encouraged them to move into leadership roles, and the extent to which the MSSE program supported the development of increased competency as a science educator, a correlation was computed. Thus, the Spearman rho statistic was calculated  $r_{(165)} = .19, p = .01$ . The direction of correlation was positive, which means that MSSE graduates who felt like their competency as a science educator highly encouraged them to take on a leadership role tend to more highly credit the MSSE program with contributing to the development of their competency as a science educator. Using Cohen's (1988) guidelines, the effect size is .04, which is a low effect size.

To investigate if there was a statistically significant association between the extent to which participants felt their knowledge and experience collecting data and using it to drive instruction encouraged them to move into leadership roles, and the extent to which the MSSE program supported the development of their confidence in collecting and using data to drive instruction, a correlation was computed. These variables did not have a high  $r^2$  value, which violated the assumption of normality. Thus, the Spearman rho statistic was calculated  $r_{(163)} = .215, p = .006$ . The direction of correlation was positive, which means that MSSE graduates who felt like their ability to collect and analyze data highly encouraged them to take on a leadership role tend to more highly credit the MSSE program with contributing to the development of their confidence in collecting and analyzing data. Using Cohen's (1988) guidelines, the effect size is .05 which is a low effect size.

To investigate if there was a statistically significant association between the extent to which participants felt their science content knowledge encouraged them to

move into leadership roles, and the extent to which the MSSE program supported the development of their science content knowledge, a correlation was computed. These variables did not have a high  $r^2$  value, which violated the assumption of normality. Thus, the Spearman rho statistic was calculated  $r(163) = .100$ ,  $p = .199$ , which indicated that there was not a significant correlation between the two factors.

To investigate if there was a statistically significant association between the extent to which participants felt their use of a variety of instructional strategies encouraged them to move into leadership roles, and the extent to which the MSSE program supported the development of increased confidence using a variety of instructional strategies, a correlation was computed. These variables did not have a high  $r^2$  value, which violated the assumption of normality. Thus, the Spearman rho statistic was calculated  $r(163) = .248$ ,  $p = .001$ . The direction of correlation was positive, which means that MSSE graduates who felt like their use of a variety of instructional strategies highly encouraged them to take on a leadership role tend to more highly credit the MSSE program with contributing to the development of their confidence using a variety of instructional strategies. Using Cohen's (1988) guidelines, the effect size is .06, which is a low effect size.

To investigate if there was a statistically significant association between the extent to which participants felt their ability to utilize technology encouraged them to move into leadership roles, and the extent to which the MSSE program supported the development of increased comfortability using technology, a correlation was computed. These variables did not have a high  $r^2$  value, which violated the assumption of normality.

Thus, the Spearman rho statistic was calculated  $r(163) = .245, p = .001$ . The direction of correlation was positive, which means that MSSE graduates who felt like their ability to utilize technology encouraged them to take on a leadership role tend to more highly credit the MSSE program with contributing to the development of their comfortability using technology. Using Cohen's (1988) guidelines, the effect size is .06, which is a low effect size. These results are shown in Table 28, which indicates that for four of the five pairs of variables, there was a significant correlation.

Table 28  
*Spearman's Rho Statistic*

	MSSE Competency as Science Educator	MSSE Collect and Use Data	MSSE Content Knowledge	MSSE Confidence Using Instructional Strategies	MSSE Comfortable Using Technology
Competency as Science Educator	.19* .01				
Collect and Use Data		.215* .05			
Science Content Knowledge			.100 .199		
Confidence Using Instructional Strategies				.248* .001	
Comfortable Using Technology					.215* .05

\*significant at  $p < .05$  (two-tailed)

### Open-Ended Survey Results

Several of the survey questions included a space for participants to provide more information if they felt the desire to do so. The results of the open-ended responses are provided below.

Research Question 3. Question 12 asked survey participants to respond to the question “To what extent did your experience in the MSSE program support you in your development of the following practices?” and provided 16 different practices. Twenty-seven participants chose to provide a response in the optional response box following this question. Some of the responses did not directly apply to the question, and will not be addressed. Of the responses considered, one response indicated that program did not contribute, stating “The program did not prepare me to be a leader.” A second response indicated that the MSSE program provided more support in different areas than those listed in the question, stating that “the MSSE program was a great program that enhanced my teaching, but not in any of the areas indicated above. I learned a lot of science and how to apply science but the pedagogy part of the MSSE program was not a highlight. I want to make it clear that this is more about me and my teaching style than about the virtues of the MSSE program.” Another response indicated that the MSSE program supported existing practices, stating that “my school and department do a great deal of professional development in all of the above sectors, so my experience with MSSE just reinforced what I was already doing.” Several responses demonstrated a positive perception regarding the extent the MSSE program supported the development of practices. Two of these referenced the capstone project, with one individual responding

“I enjoyed applying my capstone project to my own classroom situation at the time I received my MSSE.... I still enjoy implementing science in my lesson plans for my students in my classroom at present.” The second response regarding the MSSE program and the impact of the capstone project stated that “the use of the action research model has been very good both for improving my chemistry course as well as assisting colleagues to improve their professional experience.”

Question 14 asked participants to respond to the question “to what extent do you feel your participation in and completion of the MSSE program contributed to the development of the following leadership qualities? The four qualities were: using effective strategies to facilitate positive change, having an accurate picture of one’s self in terms of strength, values, philosophy, and behaviors, demonstrating commitment to reach higher standards and readiness to take action to improve, and possessing and using professional knowledge and skills in providing the most effective learning opportunities. In response to this question, 13 survey participants opted to provide an open-ended response. Some of the individuals responded that the MSSE program supported them on a journey that they had already started, for example, one individual stated that “I was always on this path. The MSSE program was a continuation.” Another individual had a similar response, stating that “I am the type of person seeking ways to improve my instructional tool kit so I was doing the last two items prior to MSSE and MSSE was another opportunity for improvement.” Other comments indicated a perception that involvement in the MSSE program contributed to the development of leadership qualities, such as the following statement: “I credit the MSSE program with updating my

skills and keeping me fresh after many years into a teaching career. I believe many teachers become stagnant doing the same thing year after year.” Another individual voiced that the “MSSE [program] gave me confidence in knowing what I know and being able to share it with others.”

The themes that emerged coincided with the themes that were identified in the analysis of the case studies. A small group of individuals did not perceive that the MSSE program provided support in the development of specific leadership practices or qualities. A larger group of individuals indicated that their experiences in the MSSE program served to reinforce positive practices and provided an opportunity to continue developing leadership practices that they had already been involved in. Finally, a third group of individuals indicated that they perceived their involvement in the MSSE program as having a large impact on the development of specific practices and leadership qualities. Several individuals in this group cited the capstone project as being instrumental in providing them with opportunities needed to develop specific skills.

### Summary of Survey Results

The quantitative results obtained through the administering of the survey provided information about the leadership roles filled and pathways taken by MSSE program graduates. Survey participants indicated choosing to fill roles or being recruited by an administrator as the most common pathways taken into teacher leadership roles. The quantitative results also indicated that MSSE program graduates perceived that the MSSE program, through developing several different leadership skills, characteristics, and practices, supported or contributed to their leadership development or progression. The

open-ended qualitative responses provided some additional information that served to further support the survey responses. Several individuals for each of the questions analyzed indicated that they perceived their involvement in the MSSE program did support the development of leadership skills and qualities. Several other individuals indicated in the comment box that they had already been in leadership roles or focusing on certain skills, but that the MSSE program served as a means of reinforcement and supported the work they were already doing. However, a very small number of survey participants used the comment box to indicate that they felt the program did not make an impact on the development of leadership skills or qualities. Additionally, while it is outside the scope of this research, it should be mentioned that several individuals provided comments that indicated frustration in encountering barriers that prevented them being involved in teacher leadership.

### Level 2 Results

This section provides an analysis of the case study data gathered in the second level of this study to answer the following central research question: How do MSSE graduates move into roles of leadership? The sub-questions were: 1) What pathways do teachers take in moving into roles of leadership? 1a) Were educators recruited, self-motivated, assigned a role? 1b) Were there other motivations? 2) Did MSSE program graduates demonstrate progression in their involvement in leadership? 2a) If so, to what extent? and 3) Did MSSE program graduates perceive that the MSSE program supported or contributed to their leadership development or to a progression in their leadership involvement? 3a) If so, what specific roles or triggers did the program provide?

### Individual Case Studies

Individual case studies were written based on case record that had been created with data obtained by the document review, case study participant interview, and principal interview for each participant. Table 29 shows some of the factors that were considered when selecting MSSE program graduates for participation in the case study. The table also provides a quick snapshot of how long each person has taught, the grade level and content they taught, some of the leadership roles they currently held, and the pathways taken to move into their leadership roles.

Table 29

*Case Study Participants' Teaching Placements and Years of Experience.*

Case Study Participant	Years of Experience	Grade Level	Content Area	Leadership Role(s)	Pathway(s) into Leadership Role
Ms. Akin	9	5 <sup>th</sup> grade	Reading and science	Literacy STEM fair	Recruited Volunteered
Ms. Ackerman	11	8 <sup>th</sup> grade	Earth Science	Technical Lead Mentoring	Applied Recruited
Mr. Dirksen	16	k-5	Leadership role is full time position	Instructional Coach	Applied
Ms. Hoffer	6	9-12 and online university	Biology, AP Biology, Dual credit Anatomy-Physiology	PLC Focus team leader Advise pre-service teachers	Volunteered Volunteered Recruited

Table 29 Continued

Ms. Jessen	19	9-12 school	Leadership role is full time position	Assessment Coach	Applied
Mr. Marshall	22	9-12	AP Ecology, Chemistry	Mentoring new teachers, Cluster Board	Volunteered Volunteered
Ms. Minske	9	University	Biology	Writing Curriculum	Recruited
Mr. Nowell	9	9-12	Biology and Science electives	Developing Outdoor Courses, Developed Hybrid Course	Volunteered Volunteered
Mr. Semmler	15	9-12	Science and Math	Head of Data Management	Recruited
Ms. Stahl	7	7 <sup>th</sup> grade	Science and Math	NGSS committee Performance-based Grading Committee Resource Team	Volunteered Recruited Recruited
Mr. Tollefson	26	7 <sup>th</sup> grade	Science	Advise pre-service teachers, Informal Science Department Chair Mentor new staff	Recruited Volunteered Recruited

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A total of 11 MSSE program graduates and their principals were interviewed for the case study portion of this research. Documents including application materials to the MSSE program and a current resume were reviewed as well. Data collected for each individual was collected, organized into a case report, and finally converted into a more reader-friendly case study. The individual case studies are presented this section and have been organized by the extent to which the individual perceived the MSSE program impacted their leadership development and progression.

Program Had Neutral Impact. Three individuals indicated that the program had a neutral impact in reference to the extent to which program provided support that contributed to the development or progression of their leadership. Their individual cases are provided in this section.

*Ms. Hoffer.* She has been teaching high school science for six years. At the time of her interview, she was teaching at a large high school in the Northern Rocky Mountain West, in a suburb of a large metro area. The school she worked at served just under 2000 students. Ms. Hoffer was teaching advanced placement biology, dual credit anatomy and physiology, and dual credit biology at the high school, and astronomy, environmental science, biology and dual credit anatomy and physiology through two different online schools. She was described by her principal as being a “very high quality teacher” that really “cared about student learning” and as hard worker who was well respected and held in a high regard by her colleagues.

Prior to her involvement in the MSSE program, Ms. Hoffer was very involved in leadership in her school. She served as a teacher leader in that she provided resources for her students and other educators on her website, wrote and was awarded a grant that allowed for her to convert lessons into videos and utilize a flipped classroom design, implemented a letter grade free system in which students could earn points, served on several professional learning committees, facilitated in-service trainings, had student teachers observe her classroom, and provided science experiments and lessons for pre-K students. She also demonstrated involvement in several professional associations and started teaching at an online high school in addition to her full time teaching position in 2011.

*Current leadership roles.* Ms. Hoffer continued to serve in a leadership capacity in her school. She served as a member of a professional learning community. She also served as a member of a ten-person leadership team. The leadership team role was a supplemental position, and involved working with the building administrators and other team members to help make instructional decisions. Through this position, she also was asked to provide modeling of specific instructional strategies for staff. She also served as a focus team leader, through which she led her team in their role of creating a monthly faculty news letter that focused on providing staff with professional development. Ms. Hoffer also worked with pre-service teachers and frequently had student teachers and practicum students observing her teaching. She also presented professional development to high school staff during in-service days.

*Pathways to leadership.* When asked about how she came into each of the different leadership roles, Ms. Hoffer first spoke of the professional learning community role. The school had offered a training several years ago, and none of the other science teachers were interested, so despite being the newest member of the science department, she agreed to take part. Originally, the position was not tied to a stipend, but over the course of a few years, a stipend was added and the process to become involved become more formalized as well, with members being appointed or being asked to participate by an administrator.

Her role as the focus team lead stemmed from a project of hers that she advocated with fellow teachers and with her administrator. She felt that there was a real need for teachers to have access to good quality professional development, stating that “I felt that ...the professional development in our school was really lacking”. She also noted that so many things in education were changing, such as the increase in access to technology, and that teachers were not receiving the support needed to make the most of the tools that they had. She advocated for about a year, made about four months of sample newsletters and showed them to her principal. She was given permission to post the newsletters that year, and by the next year, the newsletter became the objectives of one of the focus teams.

When asked about working with pre-service teachers, she felt that that role stemmed from word of mouth. As student teachers and their university supervisors came into her classroom, she started receiving more and more requests to have pre-service teachers observe her class. She also provided professional development, both at her

school and at the summer conference associated with one of the online schools she works at. She stated that she was usually recruited in an informal manner by her principal to present at one of the professional development days at the beginning of the school year. This leadership role started out with her involvement on the professional development team, a role she no longer has. Members of the team would be asked by the principal to provide some presentations, and so she would either volunteer herself or be volunteered. Her principal added that through informal conversations, he came to realize what she could offer other staff and would ask her to present on instructional strategies and other topics that were aligned to the school goals. Ms. Hoffer indicated that she also presented at summer conference associated with one of the online schools she works with, and has volunteered to do that.

*Motivation to take on leadership roles.* When asked about her motivation to move into or take on the different leadership roles, she said “I feel like we need to draw a bigger circle, and we need to drive change...I just really don’t like the saying that we can only control so much, because I feel like we can change more.” When asked if there were any specific supports or factors that motivated her to move into leadership roles, she stated that she had been driven to make a bigger impact and affect a larger number of students. She followed this up by stating “I don’t think that being a leader is the biggest part of that, I think it’s that you’re a leader to impact student learning.” She reported feeling that being involved in leadership roles had had a positive impact on her school because she felt there was a benefit for teachers at her school to learn from professional development she had provided on different teaching styles and strategies. As far as

personal outcomes, she stated that her involvement had been really good for her, and that it had “helped keep me interested in education.” She also stated that she would like to teach pre-service teachers, as it would allow her to drive change in how instruction is provided for an even larger group of students.

*Leadership progression.* When asked about her leadership progression, she said her involvement has increased over her career, because “it seems like one you do one thing, that’s sort of your thing and then you just keep adding to it.” She also acknowledged that by being involved in leadership roles, it opens the door to more opportunities, stating that “once your administrators know that you’re a ‘will do’ kind of person, they definitely ask for you first.”

*MSSE program impact on leadership development and progression.* When asked about the impact her involvement in the MSSE program had on the progression of her leadership skills, Ms. Hoffer said she felt that it had been a neutral factor. She stated that she was always “set forth in what I was going to do.” She did feel that the MSSE program was valuable as a mechanism to provide the master’s degree behind her existing philosophy about education, but that it hadn’t resulted in a change of roles, as she already held the leadership roles prior to entering the program. She acknowledged feeling that she had benefited from completing the capstone project, as the process encouraged her to collect data and gave her a greater respect for educational research. However, she felt the MSSE program helped provide tools, such as understanding formative and summative assessment, instilling best instructional practices, and providing a stronger science foundation, but did not feel like developing teacher leadership was a major focus of the

program. Her administrator had worked with her both prior to and following her involvement with the MSSE program, and he supported her statements. He felt that she had always served as an effective leader and had always been willing to get involved, but observed an “increase in knowledge of ...instructional strategies, assessment strategies,” and strategies that helped students be successful. He felt that “her increased knowledge added to her already existing leadership skills and ability [and] allowed her to more clearly articulate .... what’s good for kids, and help other teachers ...in that process.” He closed by stating that “Most importantly, she was a very high-quality teacher. I think high quality teachers are good leaders.... she was also adept at applying those same skills that made her a good teacher to our faculty and to a leadership position within the building.”

*Mr. Semmler.* Mr. Semmler is a high school teacher who teaches high school science and math at a private school in the Caribbean. He has been teaching for about 15 years and worked for several years as an ecologist in Canada prior to starting his teaching career. His current school has students in grades kindergarten through 12<sup>th</sup> grade, and serves about 900 students. The school utilizes the United Kingdom national curriculum. Mr. Semmler graduated from the MSSE program in August of 2009, and was described, in the letters of recommendation submitted to the MSSE program, as being involved in extracurricular activities such as coaching athletic programs, and going beyond the normal expectations. His current principal described him as very committed, child-centered, and organized.

*Current leadership roles.* Mr. Semmler's current leadership role involved serving as the head of data management in addition to teaching science and math as a classroom teacher. He has served in this role for three years. This role involved organizing all of the cognitive assessment exams and tracking the progress for all students in the school. His principal explained some of the work that Mr. Semmler did in this role. "We assess the students formally three times a year in order to formally report back to parents." From those formal assessments, data is analyzed, gaps are identified, and for students who are not performing well, appropriate interventions are identified. Mr. Semmler is able to help administrators and staff navigate this process and obtain the data needed. He is able to serve others in the school through tracking student progress, organizing assessment data, and sharing student progress through liaisons with department directors and year coordinators. Mr. Semmler is also in charge of the Duke of Edinburg program, a program in which students engage in outdoor skills, physical activity, and service learning.

*Pathways to leadership.* Mr. Semmler took on the data management role after serving as the head of exams. The head of exams role was a very involved role that required him to organize all of the testing done in the school, including college entrance tests and advanced placement tests. He was recruited for the data management position by his principal in a fairly informal manner. He had a conversation with his principal and was given two leadership roles to choose from: the head of the mathematics department or the head of data management. While the conversation was informal, he did have to formally apply for the position. His motivation to move into the head of data

management was two-fold. He stated that the head of exams was “a rather involved role, and quite stressful and not terribly rewarding”, involving a significant amount of organizing and scheduling, so the head of data management provided a new avenue. He also thought that the head of data management position sounded interesting and that it “was the way forward, going in terms of career advancement” as it would help him better grasp how to make data driven decisions. In regards to his role advising the Duke of Edinburg program, he was informally recruited by an administrator to fill the role.

He felt that his involvement in the data management role produced positive personal outcomes as he has a better feel for what is happening in the whole school, and school-wide outcomes as he felt that through his role, he was able to assist department heads in making better decisions. He stated that the appropriate systems are now available to allow teachers to utilize data, and that the process of getting the systems up and running has been positive. He stated that he felt there was still room for improvement, and would like to see data used to make more involved decisions, but has been pleased with the outcomes that have come from serving in the data management role the last three years. He has also received positive feedback from external school evaluators who were impressed with the systems put in place for data management.

He feels that this role has complemented his professional goals, but stated that he doesn't know where his path will lead him in a professional sense. He is currently in a position where he is still teaching in addition to filling the head of management role, but would be willing to move into a position that doesn't require him to be in the classroom.

He cited being self-motivated and preferring to be involved in decision making as a motivator for him to take on leadership roles.

*Leadership progression.* When asked about how his leadership has progressed over the length of this teaching career, he said “I think it’s just an ongoing process, you...pick up the skills and gain experiences and gain wisdom...as the years tick by....and you’re able to provide some guidance for other staff members.” He also acknowledged that leadership opportunities increased as he gained experience. His principal expressed that she had “seen his leadership qualities progress” and that Mr. Semmler has grown into his current role in both how he manages the work and how he shares information with others.

*MSSE program impact on leadership development and progression.* When asked about whether he felt his involvement in the MSSE program contributed to the progression of his leadership involvement, he said he felt that the credential of having a master’s degree was more influential than the program in that regard. He felt the program helped him carry out his action research project, and he enjoyed having flexibility in which courses he could select, but felt that “in terms of career advancement...the only things I benefitted from the program was.... the capstone project and of course, the credentials.” He felt that the capstone project did help support the development of his leadership skills due to the rigor of the program, “asking you to be really reflective...and to provide evidence for what it is that you have done.” He also thought the skills he learned in completing his capstone project were beneficial as he moved into the head of data management position, stating that in that role he had to “start

looking at data, looking at evidence, and looking at trends....it [the skills learned through the capstone project] has been quite useful.”

*Ms. Stahl.* Ms. Stahl is a middle school science teacher who has been teaching in a classroom for seven years, but has over fifteen years of experience when including her outdoor and experiential education background. She currently teaches 7<sup>th</sup> grade science and one section of accelerated math at a 6-8 middle school located in a college town in the Rocky Mountain West that has about 250 students per grade. She describes the student population as being predominantly Caucasian, motivated, having a high regard for education, and with a fairly high socio-economic status. Before taking on a classroom teaching position, Ms. Stahl taught for outdoor adventures and worked as an adventure coordinator at a charter school. She sought out other outdoor education programs including working as a field instructor and leading backpacking trips through the area. Ms. Stahl graduated from the MSSE program in August of 2015, and took a variety of science courses, including several ecology and field courses through the program.

Previous to her involvement with the MSSE program, she mentored new teachers and designed an inquiry based curriculum. She also presented at outdoor recreation and education conferences and attended NSTA conferences. In her letter to the MSSE program, she stated that she felt that her own education in science courses lacked depth and was hopeful that graduate school would provide a depth of knowledge and pedagogical practices she could implement in her classroom curriculum. Her current administrator described her as an active learner, and a collaborative and knowledgeable educator.

*Current leadership roles.* Ms. Stahl currently fills several leadership roles. She serves on an NGSS committee, which is a group of teachers who are working together to start the process of realigning science curriculum to be more aligned with the NGSS. She has also served on a performance based assessment committee, which has a focus of bringing performance based assessments to the middle school grade level. The committee has been examining teaching practices and science curriculum and is in the process of identifying what changes should be made to better fit and allow for the use of performance based assessment practices. She also serves on a team called the teacher resource team which is made up of a group of teachers who volunteer to serve on the team. The resource team's focus is school improvement, and the teachers on the team meet twice a month to discuss successes or struggles in the classroom, school needs, and what can be done to get needs met. The resource team has also developed activities for the advisory program which serve to assist other teachers who may need support in running their student advisory time and has created some guidelines to support teachers in the process of using student led conferences. She also briefly mentioned that she contributed to a career and college readiness framework committee and that she was awarded a grant to attend a week long mathematical modeling workshop at the local university. Her administrator confirmed her participation in these roles, and disclosed her involvement in what he considered an informal role. Ms. Stahl has collaborated with the other 7<sup>th</sup> grade science teacher in way that's "not a formal leadership role, but I think that informal, working with colleagues and having good dialogue and communication and sharing ideas, that's definitely been in place."

*Pathways to leadership.* Ms. Stahl was informally recruited for her work on the performance based assessment committee. The recruitment stemmed from a conversation she had with her administrator, in which she indicated that she had experience with performance-based grading at her previous school, as the report cards and grading systems were in the process of adopting a performance-based grading approach when she was there. She had had this conversation with her principal in her current school about the practice when she was hired, but the implementation of the practice was put on hold that year, as Ms. Stahl was on maternity leave for part of the school year. Towards the end of that school year, she had another informal conversation with her principal, through which he asked if she would help get the process going. Her involvement with the teacher resource team began through an informal process as well, with her principal asking if she was interested in participating. “My principal is pretty good about ...saying ‘Hey, would you be interested in doing such things?’ ...anyone who’s interested can come.” Her involvement in the career and college readiness framework committee was a more formal process, in which she received a notice that she had been nominated to participate.

Her motivation for taking on the various responsibilities associated with the roles she fills is tied to her desire to drive changes at the school level that positively impact students. “I think a big part of it is that I can see what I think is best for students.” She also referred to her experience working in smaller schools, where if there was a need for something to be done, she would make it happen. Working in a larger school that has district oversight has been somewhat frustrating, as Ms. Stahl said:

My own motivation is probably selfish, that I’m...tired of waiting for someone to tell me what to do, and I’d rather...sit down over the summer

or go to a workshop outside of school to brainstorm with colleagues about what that would actually look like...and create those performance tasks.

Ms. Stahl felt that her own drive and background with being able drive change in a smaller school was what triggered her to be active in teacher leadership. She indicated that she had found, as an outcome of being involved in leadership roles, that she is sought out more to participate in other things. "It's like it's.... a consequence of people being like 'Oh, you're...invested or excited about doing these things here, so I'll suggest that you participate in this other thing', so...it's additive." As far as outcomes in relation to her leadership involvement at the school level, she felt she was too new to the school to be able say if she had made an impact.

She discussed having professional goals in which she would like to work as an instructional coach or teach other teachers. She felt that her current leadership roles have complemented these goals as they have provided her with a "better perspective of...what's happening at the classroom level, at the district level, or at the department level.... I think it is good in A) sort of establishing my awareness, but B) establishing my network of connections of people who are involved in those things." She also stated that she would prefer a science focus, and would like to help other science teachers incorporate a more hands on approach in their curriculum. She also mentioned that in her state, many of the science and math teachers at the middle school level are certified with a kindergarten through eighth grade certification. She feels this is a challenge, as the science and math teachers may not have the content knowledge needed to teach middle school courses. "I think a lot of teachers heave room to grow in their.... best practices."

*MSSE program impact on leadership development and progression.* Ms. Stahl felt that her leadership involvement and capacity had progressed over the course of her career, stating that “when you first start out, you’re like so head in the water...you can’t think about progressing.” In talking about leadership progression she mentions her motivation for starting the MSSE program: “I’d been teaching at one school for four years and was kind of feeling like I was needing some more professional development myself...so that’s why I initially did it” [started the MSSE program]. She felt that it was hard to pinpoint whether the program impacted her leadership progression, as she changed schools following the program, and so her leadership progression could have been impacted by that change as well. “I would say, if nothing else, it’s [the MSSE program] given me more confidence, in terms of ...my own content knowledge.” The program also provided a resource in that it created some connections for her with area scientists and entities like the game and fish department which she incorporates into her classroom. She says “the program got me to those people...but it’s sort of separate.” Her principal added candidly that in the three years they’ve worked together, he’s seen her as “learning and always growing” and “continuously reflecting on her practice” in the classroom and as being a leader of her colleagues, but couldn’t say whether it was a result of the MSSE program based on the short period of time they’ve worked together.

Ms. Stahl felt the program did improve her science content knowledge, referring back to the challenges with having a general science certificate for teaching. “You’re also expected to teach any sort of scientific content 6<sup>th</sup> through 12th grade and I think that’s a lot to expect of teachers...to really have a deep content knowledge if they

didn't... have an extensive science background in that one area." Through the knowledge built in the MSSE program, she felt that she could speak on science topics with more authority and also had a more current understanding of what was known and what research was happening. This increase in knowledge had an impact on her confidence as well, as she said "I would absolutely agree that it deepened my confidence and that.... I didn't have many of the sort of graduate level or higher level science classes in my undergraduate" [program].

She also accredited the MSSE program with instilling her belief that science teachers need to be doing science and connecting with area scientists. She completed a science-based research project, which the program provides as an option, but is not usually the norm. She said "I think that was really important, that I took away [the message that] science teachers need to be out connecting with scientists in their field because that's how I think we get kids excited about it and keeps our...practices current." She continues to make a point to connect with local wildlife agencies and universities and invites scientists into her classroom or finds opportunities for her students do data collection in conjunction with area agencies. "That was my big take away...in terms of leadership, and I've been really pushing our science teachers here to...connect with more ...scientists in our community."

Ms. Stahl didn't feel that the MSSE program provided specific support in the development of leadership skills outside of providing her with the opportunity to connect with scientists, but did mention the impact an advanced ecology course had. She was given the opportunity to collect basic data in the field, and the experience resulted in

some reflection upon her own instructional practices for data collection. She felt that the course pushed her to take on a science –based capstone and got her “thinking about how hard it is to do really good experimental design.” She also mentioned that through the process of working on her capstone project, she feels more confident in creating polished worked and in sharing what she has done with others, stating that she’s “much more willing to take that risk” because “at that point, you’ve...had so many people in the MSSE program.... look at your work and give feedback on your work.”

Program Had an Indirect Impact. Several of the individuals that were interviewed indicated that the MSSE program had an indirect impact on the development and progression of their leadership. These cases are provided in this section.

*Ms. Jessen.* Ms. Jessen has been in education for almost twenty years. She came to education as a second career, first earning a degree in mechanical engineering in 1983. She opted to take a few years off to raise her family, and later found herself working as an assistant teacher. Three years later, she chose to go back to school at night, and earned a certificate of studies in education that year. Her first teaching position was teaching high school physics courses. She later moved to a large public school in the mid-Atlantic region and continues to work at this school. The school is located in the suburbs of a major metropolitan area, serves grades 7-12, and has student population of about 4,000 students. The school also has a strong International Baccalaureate (IB) program, a very rigorous program that was originally designed to aid in the education process of the children of diplomats. In part to the large number of students in the IB program, the school is considered to be fairly prestigious and is known for high SAT scores and a high

number of students going on to college. She originally taught physics courses, including several IB physics courses.

She graduated from the MSSE program August of 2012, and during the time she was involved in the MSSE program, took courses focusing on physics such as conceptual physics, special relativity, general relativity, and comparative planetology. Her leadership involvement prior to the MSSE program included serving as the physics team leader, in which she led as many as five other physics teachers in the development of creating common assessments and evaluating data, serving as the department chair for the entire science department, which involved taking inventory and reorganizing lab equipment, coordinating ordering of supplies, and supporting other teachers in instructional matters. She also worked on summer curriculum projects for the county, doing work such as aligning state curriculum with county curriculum. Her current principal of seven years described her as being a model teacher, very student centered in her assessment coaching approach, organized, and inclusive of others' ideas.

*Current leadership roles.* Her current leadership role has taken her out of the classroom. She serves as the assessment coach for the high school and organizes all of the logistics regarding testing, including the administration of online tests that serve to verify the credits students have earned in the high school with the state. This involves a great deal of coordinating with students, testing different groups of students during different times of the school year, and suggesting mentors and study resources. Through this position, she also fills a significant role on the school improvement committee,

providing data to help identify school weaknesses and to drive decisions on improvement.

*Pathways to leadership.* Ms. Jessen served in a leadership capacity in several ways prior to moving to the assessment coach position. She was motivated to move into this position for several reasons. She had been assigned five sections of IB physics for several years, and the work load necessary to teach IB courses was considerably high. Even after requesting that one of the six physics teachers would be assigned one section to lighten her work load, she found herself year after year with all five of her courses being IB courses. She felt that she wanted to continue to be part of education, but could not continue to manage such an intense work load year after year. She also noted that the administration seemed to offer less support to teachers in general. She sought out her new position as way to stay in education, but transition out of her current work situation. The position was acquired through a very formal process, requiring an application and an interview with a four-person panel.

Ms. Jessen indicated that her involvement in this position has been positive, but not without challenges. In order to manage the large amount data created by the 24 schools in the district, and in order to allow the assessment coach at each school to contribute to a data base, the district uses the Microsoft access program. The use of this program posed challenges, and Ms. Jessen found the first year of working in the position to be somewhat frustrating. She does feel that she has increased her confidence in the position, and said that she felt within a year or two, she would be comfortable taking on a leadership role in helping a new person navigate the position and program used. She also

mentioned that she appreciated having the opportunity to make a positive impact on a different group of students than those she worked with teaching IB physics courses. “Now, the kids that I work with repeatedly are the kids who are barely passing a lot of their classes.... I have to give them some support materials and show them resources where they can study on their own, and encourage them....so, it’s really been different in that regard.” She also felt that the role has balanced out her career experiences, in that she served as a classroom teacher and science department head, and this position has been another opportunity to be involved in one of the many aspects of education. Her principal added to this, stating that “She has the ability to work with people...it could be the most difficult situation...but she has the uncanny ability to not put people’s teeth on edge in a stressful environment during testing time. She’s direct and lets people know what they need to do, what their role is, and how she can help them.”

*Motivation to take on leadership roles.* When asked if there were any factors that encouraged her to take on leadership roles, she referenced positive feedback. “When I’ve gotten that feedback from...the students that I was working with.... that what I was doing was working, it gave me the confidence to share what I was doing with those around me.” She also said that having feedback from co-workers and administrators that her “ideas are really unique and good” and that “what you’re doing needs to be shared” as a nudge towards leadership.

*MSSE program impact on leadership development and progression.* Ms. Jessen self-identified with being a leader, and mentioned involvement in leadership roles in middle school and high school. When asked about the impact the MSSE program had on

her, she cited that the program exposed her to a variety of different teaching situations and experiences through conversations with other MSSE program students online and in person. While she didn't feel that MSSE program directly impacted her leadership development, she felt that by helping increase her confidence, the program had indirect effect. "The experiences that we have give us more confidence, and then that confidence translates to .... A natural position of leadership. I never felt like, 'oh, this is going to help me be a better leader'. But I think a lot of it indirectly did." Her principal perceived that "it [the MSSE program] probably brought her self-confidence...and cemented her knowledge of her own self," and added that "she's always been a confident individual, but I would just say that it just gave her the confidence to then look at some other opportunities besides the classroom where she could actually benefit others."

Ms. Jessen felt that the capstone project did support her development in being able to select a research topic that she was naturally interested and being able to explore and involve her students in the process. She also mentioned that she appreciated being able to select science courses that directly applied to her teaching situation, especially since she had started as an engineer, and hadn't taken all of the same courses a lot of physics teachers had taken as undergraduate students. She was able to use these courses to supplement her content knowledge, which in turn, helped her share with other science teachers.

*Mr. Tollefson.* Mr. Tollefson has taught middle school for over 25 years, and currently teaches 7<sup>th</sup> grade general science in a college town in the Rocky Mountain West. The school district serves about 1400 students in three different buildings, and

covers grades kindergarten through eighth grade. Mr. Tollefson graduated MSSE in December of 2009, and took a variety of science courses through the program. Prior to his involvement in the MSSE program, he had started to pursue graduate coursework in Curriculum and Instruction, but changed programs because wanted to pursue his master's degree in science education. He was involved in some leadership roles as well, as he had earned grant opportunities, participated in overseas education experiences, and supervised undergraduate students during their field experience. Mr. Tollefson's principal of three years described him as organized, collaborative, very knowledgeable, and approachable.

*Current leadership roles.* Currently, Mr. Tollefson serves as an unofficial science department head, mentors new teachers, and helps with curriculum revision. One of his responsibilities includes meeting with new teachers during the summer to go over school procedures, science materials, and curriculum. Mr. Tollefson also oversees pre-service teachers.

*Pathways to leadership.* Mr. Tollefson indicated that he moved into the mentoring position through a more formal process, as there is a stipend involved. However, the process started with an informal discussion with the director of mentoring. He requested that Mr. Tollefson apply for the position, as the new teacher would be in his department. He described the process as coming about through "an informal request, but also...through a formal channel." He also mentors another teacher voluntarily. He serves in an unofficial capacity as the science department head and was recruited to support the transition of new science staff by his building principal. Mr. Tollefson served

on a curriculum review, and volunteered to facilitate the process of realigning the curriculum to NGSS standards over the next year or two based on how the state decides to incorporate the standards.

*Motivation to take on leadership roles.* When asked about what motivated him to take on leadership roles, he acknowledged that he had been one of the youngest members of the science department for many years, and that those more experienced teachers held onto many of the leadership roles. As those teachers retired and leadership roles became vacant, others started to look to him, as he was the teacher with the most experience and had his master's degree. He said that at the time, he had "this recognition that it's time to...be more professional, have a more professional presence...in the building and in the district." The outcomes of his involvement have been positive. He cites that being able to reflect on the instructional practices and curricula used in the school and then being able to compare those practices to what the Next Generation Science Standards propose has been affirming. He also stated that he feels his principal respects his opinion and trusts him regarding the science curriculum. His principal confirmed this, stating that "I'm never concerned that there's going to be a mistake made or that.....a conflict is not going to have resolution. I trust him, I trust his judgment and his leadership skills."

*Leadership progression.* When asked about how his leadership involvement has progressed over his career, he acknowledges his growth. "I don't think I want to be in an administrator position" but that he has become more involved in mentoring and has also transitioned into taking an informal role in leading the science department. He also mentions his curriculum development work at the county level, stating that "that's

become more of a .... kind of a stopping point for me.” He acknowledges that he hasn’t had the desire to step into state leadership positions, but feels like the opportunities are there if he were interested. He also indicated that he has received an increase in requests to take on pre-service teachers from university staff.

*MSSE program and leadership development and progression.* When asked if the MSSE program had an impact on his leadership progress he stated that the program was “a confidence builder...with science.” He also mentions a course, that while it was taught by one of the core professors of the MSSE program, was not offered in affiliation with the MSSE program. The course focused on the different practices involved in transitioning to instruction based on the NGSS. He felt that this course made a big impact, as it provided him with the ability to talk about what a lesson should look like and lead the adjustment of curriculum.

When asked if there were any factors that supported his development as a teacher leader, he mentioned two: the more experienced teachers leaving, creating a need for him to take on leadership roles, and the previously mentioned course that he took that gave him a solid understanding of the NGSS standards. When asked about the impact that the MSSE program had on his development he cited the credentials as being important. Several of the leadership roles he served in required individuals to have a masters’ degree, and so completion of the program allowed him to be involved in more opportunities. He didn’t feel the program directly supported the development of his leadership skills, stating that “we didn’t do a lot of that kind of talk formally in class.” However, he mentioned the benefits of interacting with other science teachers and talking

about science instruction. “Having this cohort of people, that time on campus with other teachers and being with the people that are just like you.... we have a lot of informal discussion. So while there wasn’t a formal class.... having people together was really powerful.” He felt that working through the capstone process instilled a more deliberate sense of analyzing science education literature. “Now I look at...what their methodology was and what’s the data...and how many people were a part of the process.”

*Mr. Dirksen.* Mr. Dirksen has been teaching for 16 years, and has taught mostly math and science at the upper elementary grade level, grades three through six. At the time of the interview, he was employed by a kindergarten through fifth grade elementary school in the Pacific North West. The school served about 650 students, with 60% to 70% of the students being Hispanic, and about half of the student body being classified as English Language Learners. The poverty rate of the students was high as well, with the district having gone to 100% free and reduced lunch several years ago. Mr. Dirksen was employed by the school as an instructional facilitator, and had been in that position for two years.

Prior to his involvement in the MSSE program, Mr. Dirksen had served as a member of the math leadership team, served on the district math alignment committee, served on the district leadership and assistance committee for science education reform, was a member of the instructional leadership team in his building, and attended space camp as a Boeing teacher. He also received training in an inquiry based curriculum which allowed him to travel to the regional leadership and assistance for science education reform meeting, and act as a science ambassador. David graduated from the

MSSE program in August of 2013. He took several physics courses as well several of the science field courses offered through the program. In his application essay to the program, he cited wanting to be a science resource to his grade level team, building, and school district. Mr. Dirksen's current principal of seven years described him as well-liked and trusted by staff, organized, and an advocate for practices that benefit the students.

*Current leadership roles.* As the building's instructional coach, Mr. Dirksen provided professional development to other teachers during building level professional development time and at grade level meetings. The district in which he works is a fairly large district, with 14 elementary schools. Each school has an instructional coach who attends weekly district meetings and disseminates information provided by the district to teachers in their school. Mr. Dirksen helped to share this information in his building as well as aimed to support teachers and answer any questions they had. Some of his other tasks included modeling instruction for other teachers, in which he would teach a lesson to their students in order to showcase an instructional strategy or technique. His instructional coaching focus was on reading and math, and to help teachers reach the students they serve, he often modeled language acquisition activities. There was also an assessment component in his coaching role. Mr. Dirksen looked at student achievement data to help determine which instructional group they should be placed in for their reading instruction. He did mention that "science is very back seat" and that "the district's number one goal is to ...get students to read." The reading program is such a

strong focus in this particular district due to the high number of students classified as ELL students, and there is a heavy reading intervention program.

*Pathways to leadership.* Mr. Dirksen moved into the instructional coaching position through an informal manner. The position was vacant for three years, and he had just graduated with his master's degree through the MSSE program. His principal casually suggested that he think about the position, but at the time, he declined and opted to stay in the classroom. The position remained vacant, and the principal ended up taking on much of the responsibilities involved. Through the course of that school year, Mr. Dirksen voluntarily assisted the principal in carrying out some of the tasks, and took on some of the responsibilities involved, such as running assessment reports or attending district meetings. Following that school year, he decided to apply for the position, went through the official interview process with the district level team, and was hired.

*Motivation to take on leadership roles.* Mr. Dirksen state that he was motivated to apply for the position because he was ready for a change. He had taught at the elementary level for 13 years at that point. He had been able to teach all of the fifth grade science classes for one year, but the reading scores declined following that year, so he had to return to teaching general education. This happened in conjunction with the roll out of the common core standards, and he found juggling the many different classes along with trying to integrate the new standards to be overwhelming.

He felt that the change has had some positive outcomes as well as some challenges. "Standing up in front of a group of your peers and giving professional development is not easy, especially when it's not necessarily warmly received."

However, he views this aspect as providing him with a positive outcome as well, as it fueled his production of concise and meaningful professional development for staff. He cited having more knowledge about why certain processes are done as a benefit, stating that “seeing the other side of the coin a little bit...knowing where some of the bigger decisions are coming from...has been another big outcome for me.” From the school perspective, he is optimistic, stating that the school has come a long way in integrating the common core standards, adopting a new reading program, and implementing a new math program. He felt that the professional development he has been able to provide has “helped quite a few teachers navigate both of these curriculums in a very positive way.”

When asked how this leadership role complements his professional goals, he stated that it provided him with a perspective of what it is like to work outside the classroom. He said that he wasn't interested in moving into an administrative role, but that with his years of experience in the school, this felt like a natural fit. However, he did disclose that he would not be returning next school year, as he had accepted a middle school science position. He was very enthusiastic about having the opportunity to be in a science teaching position, saying that “I've enjoyed this position here...but I miss being with the kids and having that direct impact on the students and getting to teach science full time.... I can't pass this up.”

*Motivation to take on leadership roles.* When asked if he could pinpoint any factors that supported his leadership development or encouraged him to move into leadership roles, he first acknowledged a personality trait, that he is somewhat extroverted. Then he acknowledged that he is student focused and “wants to do what's

best for the kids” and when he sees good instructional practices or a beneficial curriculum, he wants to share it. He has had support to do so from “some encouragement from different administrators over the years”, which has helped as well. He also identified there being a need as a trigger, stating that “there’s a void and .... you know where there’s a need there and being asked, and having the capacity to do that....is probably the biggest factor... putting me into a leadership role.”

*Leadership progression.* When asked about how his involvement in leadership has progressed, he responded that he felt it had, and was primarily due to his length of time working in the school, stating that “that longevity piece really promotes itself to a leadership role”. He attributed his involvement in the MSSE program as giving him confidence as a student and as a teacher. He referred to the field courses and cited the questioning techniques used as encouraging him and helping him realize he could think analytically. He also felt that he was able to utilize that questioning technique in his own practice as an instructional coach. His principal started working with Mr. Dirksen following his completion of the MSSE program, but was able to describe the progress he has seen over the last seven years. “I have seen a lot of growth.... especially in the last two years because the instructional facilitator position is more of a leadership position.”

*MSSE program impact on leadership development and progression.* In regards to the extent the MSSE program contributed to his leadership development, he stated that he didn’t feel that program directly impacted his development, but stated that there were “a lot of the little different pieces.... experiences...that put together.... just building confidence...of being able to ...learn something and then be able to talk with authority

about that topic” that he felt was a benefit of the program. He attributed the field courses with providing these opportunities that helped build his confidence, stating that “having those conversations with the professors and experts.... really built that confidence over the next...two summers.” When asked specifically about the capstone, he responded that he felt that the capstone supported his development because it provided an opportunity to dig into the research, be challenged by the process, and to learn to examine things analytically. He did mention that some of the data analysis skills he acquired through the process of completing his capstone project made his job as the instructional coach more frustrating. The way student data was measured in the school district he was employed by was not done in a way that showed true growth, but only indicated where the student fell on a classification scheme.

Program Impacted Leadership Progression and Development. Several individuals stated that their involvement in the MSSE program had a direct impact on their leadership development and/or leadership progression. The case studies of these individuals are included in this section.

*Mr. Marshall.* Mr. Marshall has been teaching science for over 20 years, and has taught AP environmental science and chemistry at the high school grade level since 2001. He had experience teaching middle school science and also had experience teaching at an international school in Portugal. He began his career in education after working for over ten years in research and technology, and had a soil science educational background. He was currently teaching at a fairly large school, with 1500 students in the Pacific West.

The school serves a diverse student population, with about 30% of the students identifying as being Hispanic, as well as serving many students from a variety of different countries. The proximity to a large, well know university accounts for some of the diversity, as the university brings instructors and their families to the area. The school itself had strong science, performing arts and language arts programs. Mr. Marshall was described by his administrator as being a fantastic teacher, great with people, and serving as one of the “go to people” on campus.

Mr. Marshall graduated from the MSSE program in August of 2009. He took several of the field study classes offered through the program. In his application letter to the MSSE program, he cited how he incorporates passion for environmental studies into the curriculum, and finds ways to take students outside. He also stated that he wanted to learn more and figure out how he can help students learn more.

Prior to his involvement in the MSSE program, Mr. Marshall had been involved in GLOBE environment program training, sponsored the national ocean science bowl team, served as a surf team sponsor, science Olympiad coach, had been an A+ for energy awardee, and had consulted for the American Board Certification for teaching excellence. He had also received several other awards as well as grants.

*Leadership roles.* Mr. Marshall held several leadership roles in the school at various times in his career. He had written grants, wrote a letter about the negative impacts of testing to be read to congress, served on a cluster board, served as a science department chair, and served as a union representative. He also helped in designing the

layout of a new high school building, spending a significant amount of time creating a plan that would better serve the school district in the future.

He was currently involved in serving on the cluster board, serving as the representative for the high school. This board allows for a group of individuals from the various elementary and middle schools, as well as the high school which Mr. Marshall is employed by, to meet and discuss what is happening at the individual schools by grade level and to better articulate content taught from one grade to the next. He was not currently serving as the science department chair as his school used a rotation for that role. Mr. Marshall also identified several informal leadership roles that he fills. He attends workshops and actively stays current on science education literature to better his own instructional practice and to be able to support the practices of others. He actively mentors new science teachers by helping them with lab activities and offering to work with them to create tests. He said that the work he does in mentoring others is “the most important leadership role that I that I fill.” His administrator added that Mr. Marshall “brings a wealth of experience” and that he is “a thoughtful leader and listener”. He also said that Mr. Marshall “embodies.... all of those kind of characteristics that any great leader has”.

*Pathways to leadership.* Mr. Marshall stated that he has volunteered for most of the leadership roles that he has filled. In some roles, he stated that staff informally requested, and that he would rise to the occasion, thinking “yeah...I can do that.” Mr. Marshall volunteered to help mentor other science teachers.

*Motivation to take on leadership roles.* He has been motivated to take on many responsibilities because he felt that there was a need for it. He provided the example of serving as a union representative, stating that “somebody really needs to do this, but ...who wants to do it.” He was also motivated in a similar manner, to provide support for other science teachers through informal mentoring. He stated that “the school doesn’t really.... provide this. The school says, ‘Look, you got this class, this, this, this, this. Goodbye.’” The school has done little to provide professional development opportunities, and he explains that some of that is due to budgetary issues, and some has been neglect. He felt that he could help to fill this void, as he continues to attend meetings and read educational literature to get fresh ideas he can bring to his classroom and to the other science teachers. He provided an example of how this has helped his science teacher colleagues. Several years ago, he attended a workshop about modeling, and while some of the information presented wasn’t directly applicable to his classroom, there was one model called a “cup of water” that he found valuable. “It’s a simple model, but yet, very different than anything else on the market, and it really demonstrates a lot of different principles very uniquely.” Mr. Marshall shared the information about this model with his colleagues and initiated writing a grant proposal to purchase a whole class set that could be shared among members of the science department. The grant writing process was a role that Mr. Marshall created by identifying the model and initiating the grant writing process.

He has had positive outcomes from mentoring staff and sharing instructional ideas. Referring to the “cup of water” model, he says “Now all three of us use it” and

“it’s actually really nice.... because people have a better tool to use to instruct students.”

Mr. Marshall also shared his use of outdoor field trips with a new colleague. Mr. Marshall is well known for taking his environmental and chemistry classes on quick class time field trips, and finds them very instructional, saying “You’ve got the beach just down the street, and there’s just so much chemistry going on there from a geology point of view.” This year, a new science teacher expressed interest in following Mr. Marshall’s practice, but voiced that he wasn’t sure how to implement the practice. Mr. Marshall invited the new teacher to accompany him and his class on one of the field trips, and modeled the practice for the new teacher. After that observation, the new teacher has been able to use this class time field trip practice with his students.

*Leadership progression.* When asked about his leadership progression over the extent of his career, he responded that he feels he has taken on more responsibilities since he began his teaching career. He related this progression to the progression of one’s family, explaining this as a natural evolution, where people go from “being a parent...to, my kids are grown up...they’re out of the house.” He feels this contributes to a progression in leadership and an increase in involvement because he has found that he feels “like I’ve had a little more time to do that [be involved in leadership] and not quite so torn” between giving time to his family or giving time to his school.

*MSSE program impact on leadership development and progression.* Mr. Marshall felt that the MSSE program “absolutely” helped with the progression of his leadership. Prior to his involvement with the MSSE program, he felt that as a teacher he didn’t feel that he could change a lot of what he was doing. Rather, he held the view that “this is the

book, this is the curriculum, and I'm going to have to stick to this pretty darn carefully.” He attributes a change from this perspective to the MSSE program stating, “I think that the action research model turned out to be very liberating.” Through the process of conducting his action research, he found himself examining what he was doing professionally. In the process of reflecting, he asked himself what would he rather be doing instructionally, how could he do it, and how it would benefit himself, his students, and his community. Mr. Marshall had always used field trips in his environmental science classes, but had not used this method in his chemistry classes, saying that “with the chemistry, I was much more...conservative.” It was from this reflection that he decided to incorporate the class period field trips into his chemistry class for his action research project. His results were very positive, and he has been using and building upon the field walk method ever since conducting his action research project for the capstone. He says “I cover more with my chemistry students now using this...the fruits of the action research model.”

He stated that his involvement in leadership has to do with how he's wired and in response to there not being “a lot of support out there.” Rather than bemoan the lack of support, he chooses to take a positive stance, stating that “I think that because of the way maybe even America is designed, I think that largely we're expected to find and drive our own destiny and to define our destiny, define our own journey.” When asked if the MSSE program helped support that journey, he said “Oh yeah, absolutely, in fact...I would say more so than anything else because it allowed me to feel that in my professional life, I was in the driver's seat. It's allowed me to take more ownership of

what I do professionally.” He refers back to his capstone project and the results he’s had incorporating the field walks in his chemistry classes, stating that if someone wanted to know why he’s “wasting all of that time taking the kids outside” he would be able to back up his instructional decision with his data. He adds that since he has “started doing this, those test scores have shot up.” He also felt like the MSSE program provided a support that encouraged him to continue with his pursuit of leadership roles in that it made him “more inclined to share with my colleagues. It definitely changed that.” Mr. Marshall eloquently described how his ability to share has progressed over his career, stating that “as I’ve gotten little bit older, I’ve come to the realization that other people are looking to me for new ideas that they might be able to use, say in their teaching or solutions to problems that they’re having with their instructional practice. And the key is...finding how for me to approach people in way which is not confrontational” so that colleagues can say “That is cool. I ‘d like to do that. Can you show me how?”

*Ms. Ackerman.* Ms. Ackerman has been an educator for 11 years. She has a degree in Earth Science Education, and has taught physical science, astronomy, eighth grade earth science, and ninth grade physical science. She is currently in her second year of teaching 8th grade earth science in a middle school in the Rocky Mountain West which serves grades 7, 8, and 9, and has approximately 900 students. She graduated from the MSSE program in August of 2011, and took a variety of science courses through the program. Prior to her involvement in the MSSE program, she was involved in her teacher’s association, served as a building representative, was active in state and national science teacher organizations, and was said to be a contributing member to her school

community, a team player, and having a willingness to go above and beyond by her administrator at the time of application to the program. Her current administrator referred to her as being organized, student centered, and very up to date in science education. He also mentioned her willingness to share information with other teachers, one on one, or through team or department interactions.

*Current leadership roles.* Ms. Ackerman currently fills several leadership roles. She serves as a local teachers' association building representative which involves attending monthly meetings, and communicating information to members. She also serves as a technical lead, and describes this role as helping teachers with technology, as well as working with a team to plan and lead weekly sessions that offer support that address technological issues such as using google applications for educators, the grade book program, or other supplemental technology teachers may be interested in learning more about. She has served on the curriculum team, which has focused on writing the end of course exams used by the district, as well as aligning curriculum with the NGSS standards. She also serves as a mentor for new teachers, and has been assigned to help new teachers in the district. Ms. Ackerman served as the department chair in her former school, and did that for five years. The role involved assisting with interviews, maintaining chemical inventories, ordering supplies for the other science teachers, and leading department PLC time.

*Pathways to leadership.* The pathways that she took to move into each role has varied. The technology lead role involved an application and interview process, which is conducted annually, where as moving into a mentoring position required a less formal

process, albeit still considered a formally assigned role, where an administrator asked whether she would be willing to mentor a new teacher in the same department. The mentoring program provides new teachers with one year of formal mentoring, but following that year, Ms. Ackerman continued to mentor one of her colleagues in a voluntary manner. She also provided some professional development to staff in a breakout group about the use of interactive notebooks, and was recruited to perform this task by her principal, who acknowledged that the professional development was created to meet the needs of several other staff members interested in learning more about interactive notebook use.

Ms. Ackerman served as the department chair in her former school, and mentioned the challenges that have come with transitioning as an experienced teacher and teacher leader to a new school, stating that it “was difficult moving to different school because many people there did not know what I could offer” and called a “humbling experience” to come into a building not be seen as the teacher leader she knew she was. Her principal supported that view, noting that the transition was hard because Ms. Ackerman had been in many leadership roles in her former school. “It was difficult ...because she was used to that and she wants those roles because she wants her department to move forward.” However, her principal acknowledged that she has taken on many smaller positions and has applied for more involved positions in the two years she has been in the school, and so she has been able to take on some leadership roles, and in her own words, is hopeful that “it continues to grow”. She cites district choices as a means of providing leadership opportunities ways to become more involved. When

asked about how her leadership involvement has progressed over the length of her career, she mentioned that not only has she become more involved in leadership roles, but also that her approach to leadership roles has changed. “I have a different perspective..... I know that I'm knowledgeable and I'm willing to share, rather than trying to prove anything to anyone.”

*Motivation to take on leadership roles.* She cites her motivation to take on the mentoring role as stemming from truly enjoying teaching teachers, and the motivation to take on the technical lead position stemming from her desire to be involved and active in a leadership role. She also mentioned having a deep personal desire to be involved, help out, and know what's going on in the school and district.

*MSSE program impact on leadership development and progression.* When asked about the impact of the MSSE program on teacher leadership development, she referred to the experience working with other teachers. She compared the MSSE experience to education and sciences courses she taken during her undergraduate work, stating that “we had one quote science teaching class, and that had four students in it, and so the program was such a cool experience to get to interact with other science teachers about teaching science.”

She also felt the program contributed to her level of confidence, stating that “it gave me a lot of confidence.” She also mentioned the impact the program had on helping her identify why she used the instructional practices she chose to use, and how this has helped develop her leadership abilities:

Certainly I walked away with a refined practice of why I do the things the way I do and how I teach which in turn, allowed me to provide better leadership for my staff.

Her course work in the MSSE program also helped her become aware of and familiar with an assortment of instructional resources, which she felt added to the variety of instructional activities she incorporates into her classroom. As far the extent to which the program supported her leadership development, Ms. Ackerman refers to her experience in working on the capstone project, stating that “as far as helping me develop into a leader, just having the chance to dive into a topic so deeply with support from the program, professors, classmates .... was invaluable.”

*Ms. Akin.* Ms. Akin has been in education for nine years and has taught students at the elementary grade level. Her passion for science education was piqued during the last semester of her undergraduate college career through a curriculum and instruction course that focused on teaching science in elementary education. She has taught second and third grade, and currently teaches fifth grade literacy and science in a large urban school district in the Midwest. Due to the urban setting of her school, she has observed that her students find science to be challenging and difficult to relate to their lives. Ms. Akin took a variety of science courses through MSSE and graduated from MSSE in August of 2014. Her leadership involvement prior to the MSSE program included developing second and third grade curricula and curriculum maps, leading an after school tutoring group for a year, and co-teaching with a special education teacher. Her current principal of seven years described her as having initiative to reach out to other staff, being collaborative, and focused on providing rigorous instruction.

*Current leadership roles.* Ms. Akin currently fills several leadership roles in her school. She coordinates the STEM fair, serves as a literacy lead, and serves on a committee that addresses and coaches teachers in implementing the common core standards. She is the main person responsible for the coordination of the STEM fair, which involves providing other teachers with support and project ideas. Her work as a literacy lead involves selecting topics and preparing presentations to be used in weekly “clusters” or meetings with grade level teachers. She focuses on helping teachers who teach grades three, four, and five. She also received training in using the reading curriculum that has been adopted by the district, and has provided professional development for other teachers by modeling lessons. As far as her role in serving on committees, her principal states that Ms. Akin “has the ability to garner buy in for different projects” and referred to her as a “servant leader” in that she’s more willing to “work along side those other people to get the job done, and she definitely believes in a sense of collaboration.”

*Pathways to leadership.* Ms. Akin helped open the school she currently works at, after working in another school for five years. She was initially hired as a math and science teacher, but during the first year of operation of the school, there was a shortage of literacy teachers. In her urban school, literacy is a major focus, as many students are reading below grade level. Ms. Akin had more experience teaching literacy than some of the other teachers, and was “thrown into the literacy piece.” While the literacy leadership roles were assigned, she still wanted to be involved in science, and so she bargained with her administration to allow her to teach literacy and science. She volunteered to be

involved with the STEM fair, and feels like she has a lot of freedom in the direction she takes that leadership role. Ms. Akin was motivated to take on the STEM fair role because of the opportunity it provided in allowing her to continue to use her degree and be involved in teaching science. She was also interested in being a part of getting the program running and deciding how to go about organizing it. Her principal supported this, stating that “in terms of the STEM fair...she totally owned that.”

Although a large portion of the leadership work that Ms. Akin takes on is not directly related to science, she reported feeling pretty satisfied with the roles. She mentioned not enjoying the reading portion initially, but stated that with the adoption of the new curriculum, she has been really happy with being involved with teaching and leading literacy. She also indicated that there was a science overlap, as the program utilizes informational text and pulls science information into the literacy curriculum. Her work with the STEM fair has been positive, in helping other teachers find projects, seeing the program grow to include students from fourth grade through eighth grade, and having the fair as a way to keep science education present in the school. She said that with “such a heavy emphasis on the core math and literacy subjects at our school, just because of... the academic scores [of our students], it’s easy to.... forget about science, so it’s nice that we have some there [with the STEM fair] because it keeps that in perspective.”

When asked about how her leadership roles have complemented her professional goals, Ms. Akin says that she feels her involvement has helped given her perspective on other options within education and on her own teaching practice, but that she doesn’t know if she wants to transition into a coaching role or remaining in the classroom for the

extent of her career. She sees her leadership roles as “giving me some hands on experience and .... making me just a better teacher.”

*Leadership progression.* When asked about how her leadership involvement has progressed over her career, she says “I definitely think I started at square one”. She mentioned that she and her current assistant principal worked together in the previous school, stating that “we’ve had a lot of time to grow together, and she’s seen me progress.” She related this progression to an increase in the responsibility required by the leadership roles that she has filled. Her involvement started with her helping with professional development by providing her input, then transitioned to her being offered small leadership roles, and eventually turned into her being assigned more formal and time-consuming roles, such as being a team member.

*MSSE program impact on leadership development and progression.* She felt that her involvement in the MSSE program helped her to be more vocal in voicing her desire to keep science content in the forefront, and being creative in finding ways to make it work. She also mentioned the benefits gained from a taking literacy in science course through the MSSE program, stating that the knowledge she gained from the course helped her to incorporate science into literacy-based activities in a way that was still valuable for students learning both science and literacy. Her principal stated that Ms. Akin had always “taken her practice extremely seriously and always wanted to be a reflective practitioner,” but that “her level of confidence and her level of passion was sparked a bit more” following her involvement in the MSSE program.

When asked if there were any supports or factors that helped her move into leadership roles, she again mentioned that her involvement in the MSSE program helped her to ask for what she wanted, as well as helped to develop the skills to advocate for she wanted or felt was needed. She also felt that her involvement with the MSSE program challenged her and got her to do things that were outside of her comfort zone while providing a great deal of support. She mentioned the capstone, stating “I believe...the capstone really helped build confidence...to take into school leadership...and knowing that...you can stand up in front of someone and give them information and be an expert.”

*Ms. Minske.* Ms. Minske is currently teaching at biology the university level in the Atlantic South East. She took a full time position in January, but prior to that, served as an adjunct profession at the same university teaching ecology and non-majors biology. She was brought on as full time staff with the plan that she would revamp the freshman biology labs and that she eventually will help start a science education program so students majoring in biology have the opportunity to work towards an education degree as well. Prior to working at the university level, she taught in the public school system for about seven years at both middle school and high school grade levels. Education has been a second career for Ms. Minske, as prior to her involvement in education, she filled various roles including working as a research coordinator, an environmental scientist, a research assistant, and a research editor. She sought out certification to teach biology and general science through South Carolina’s PACE program. Ms. Minske graduated from the MSSE program in August of 2011 and took a variety of science courses while enrolled in the program. Prior to the MSSE program, Ms. Minske was involved in

several professional education associations, received grants for environmental programs, voluntarily served as the science fair coordinator, served on several committees, and received training to implement AVID classes. Her former principal of three years described Ms. Minske as being extremely dedicated, putting in extra hours before and after school. He also referred to her as a “team player” and having a great deal of initiative, as there wasn’t a set curriculum written for middle school environmental science.

*Current leadership roles.* Ms. Minske is currently working on revamping the biology labs so that they incorporate inquiry-based instruction. Once the new labs are in place, she will be responsible for providing biology instructors with professional development to help them transition to using an inquiry-based format. Ms. Minske mentioned that several new staff will be joining the department in the fall, and that she will be working to help them transition into using the newly designed labs. Following the creation and implementation of the new curriculum, her role will expand to include working on developing a secondary science education program.

*Pathways to leadership.* Ms. Minske found herself in the full time university teaching position through recruitment. She had been teaching at the university level as an adjunct professor, and had expressed interest to the incoming department chair that she would be interested in coming on board in a full time capacity. This conversation led to a discussion about her educational and professional background. The incoming chair was impressed with her research background and had knowledge of the curriculum work she had done at the middle school level. He presented her with the idea of having an

opportunity to develop curriculum for the biology labs. Ms. Minske said that while the conversation was informal, the process was formal. The university created a new position, and she applied and interviewed for the position.

*Motivation to take on leadership roles.* When asked about what motivated her to move into this new role, she responded that she loved teaching biology, specifically freshman and non-majors' biology. She said this was because she felt the students were more excited and because there was an opportunity to make a positive impact on students not majoring in science. She also stated that she really enjoyed writing curriculum, so the position was a good fit.

In regards to what has served as a support in encouraging her to take on additional leadership roles throughout her career, she cited that feedback she has received from students as providing a big role. Ms. Minske referenced the public school that she taught at prior to working at the university, and described her challenging teaching situation in which, due to generational poverty, students lacked interest and motivation for school. In this situation, she found that her students responded well to hands on instruction. "They were really engaged. I saw their grades go up...we had students for the first time ever in science fair." Through her work, she also was able to revitalize the use of an existing greenhouse, which increased community support and feedback. She felt that being witness to that change in her students "was a huge trigger" but also stated that "it was a lot of work". Her former principal described several of the leadership roles she had filled, which included getting students involved in the science fair, forging a relationship with community entities, the area Department of Natural Resources, and providing

opportunities for students to engage in water quality studies and community gardening projects.

She has felt like her involvement in her new role has been very positive. She said that most of the faculty have expressed excitement about the incorporation of inquiry into the biology labs and that overall, her work has been positively received.

*MSSE program impact on leadership development and progression.* Ms. Minske felt that the MSSE program “absolutely” supported her development as a teacher leader. She felt that assessment and evaluation course and the foundations in action research courses were particularly beneficial because, while she had a research background, she wasn’t sure what research looked like in an educational setting, stating that “It just gave me a good feel for social science and the importance of those methods... and again, it gave me the...confidence to do my own action action research of course, too.” She valued the process of conducting her action research and felt that she was able to develop her own instructional skills through the evaluation of her students’ learning experiences. Ms. Minske said “I can’t say enough good things about the [MSSE] program. The science education program really gave me ...the confidence to be able to move forward, just because of my experience there with the professors, and the rigor.” She acknowledges that the work done through the capstone project has carried over to the work she is currently involved in. “My thesis was based on science inquiry and...the use of inquiry to increase student engagement. I could apply a lot of those methods this past semester in my classroom with my biology majors.” She reiterates this feeling, saying:

Another positive ...I just credit it to that program, the MSSE program... a lot of the methods and techniques that my professors used

going through the course, I use in my non-majors biology classes. A lot of hands on, a lot of inquiry based...just a lot of case studies...and have had nothing but positive student feedback in evaluations from those classes...continuously.

Her former principal worked with her prior to and following her involvement with the MSSE program. He expressed that he felt she exhibited more confidence following her participation in the program, stating that “there was certainly more confidence in her ability to deliver instruction.” Ms. Minske indicated that she valued the methods and techniques that were used in the classes that she took [through the MSSE program] as well as the level of rigor and professionalism. She felt this helped her develop and “not be afraid to try different things”. She mentioned that with her professional and educational background, she had research skills but not an educational background. She received her certificate through an alternative program and while the program provide training, she described feeling like she “floundered” her first and second year in the classroom. Her state required teachers earning their certificate through a non-traditional route to take graduate courses. This requirement is what led her to seek out a master’s degree through the MSSE program. She feels like the MSSE program had a really big impact on her overall development as an educator, stating several times that she finds it “hard to imagine teaching without having had Montana State [and the MSSE program].” She stated that “with education...you really put yourself out there...the program definitely gave me the confidence to do that.” She also valued the tools she learned through the MSSE program that allowed her to evaluate student learning, stating that it helped her differentiate instruction and make changes if lessons or instructional strategies weren’t working.

*Mr. Nowell.* Mr. Nowell has been teaching high school science for nine years. He currently teaches biology and biology-related electives at a small private school in the Rocky Mountain West, from which he is an alumnus. The school has a total of 350 students in grades kindergarten through twelfth grade. Due to the nature of the school, as a private school, teachers are allowed a great deal of freedom in being able to develop and offer courses they find interesting and feel the students would enjoy. The school is not subjected to the same accountability testing as public schools, and this is reflected in the course offerings. The school has a strong outdoor course program and also has a large demand for summer courses, as a high number of students are involved in competitive ski racing during the winter months.

Mr. Nowell is a recent graduate of the MSSE program, as he graduated in August of 2015. He took several field courses during his involvement with the program. Prior to his involvement with the MSSE program, he indicated several ways that he was involved in teacher leadership. He had supervised several field trips with students and had created a ninth grade science curriculum that integrated the class and outdoor program. He also had made connections with local biologists and the fish and game department, and developed and taught a course as a visiting lecturer for an area college's winter wilderness class. Mr. Nowell's principal described him as a creative and compassionate educator, stating that he is "hands down one of the most compassionate educators" he's ever met, which is quite an impression to have made considering they have worked together for only one year. The principal also expressed that Mr. Nowell is very

reflective in his teaching practices and is “constantly sharing with his colleagues what he’s doing, how it’s going, [and] how he could do better.”

*Current leadership roles.* Mr. Nowell’s leadership current leadership roles include his involvement in the field courses for the school’s outdoor program and his involvement developing a hybrid Science-English course with another teacher. He has developed curriculum to make the outdoor field courses richer and to incorporate more science content. He has also created several new outdoor courses. These courses vary in length of time, with some lasting one week and focusing on a specific topic, and others lasting three weeks and being offered during the summer. The courses also vary as to how much science content they include, but all offer an outdoor experience. One of these courses that he teaches is called Senior Quest, which is an outdoor course that allows students to camp and hike, but does not include a curricular component. In contrast, he also teaches a course for 9<sup>th</sup> graders in which the students are provided with the opportunity to go snow camping. The course was originally designed with a focus solely on snow camping and snowshoeing, but Mr. Nowell has incorporated a winter ecology component, which he feels “makes the trip more interesting for the kids.”

Mr. Nowell was also involved in the development of a hybrid Science-English course. He and another teacher worked together to create a course that incorporated both science content and English. They co-taught the course, and students were able to decide whether they wanted to earn an English credit or a Science credit.

*Pathways to leadership.* Mr. Nowell has become involved with the outdoor courses through both formal and informal pathways. From a formal aspect, all staff are

required to participate in some manner, and so some of his responsibilities in working with the outdoor programming were assigned. The second pathway that has brought him into working with the outdoor programming is voluntary. He is passionate about the field courses, and has volunteered to help with additional trips beyond what he is required to do. He has also worked on projects in which he develops more outdoor programming and curriculum voluntarily. Through this work, he has created new courses that didn't previously exist, such as a wildlife management ecology course where students learn about the greater Yellowstone ecosystem. In volunteering to create outdoor programming, Mr. Nowell is a driving force behind the variety of outdoor programming courses that the school is able to offer.

Mr. Nowell moved into the role of developing the hybrid course through collaboration with another teacher. His administrator spoke highly of Mr. Nowell's work in developing the course, stating that it is the "high-water mark of his leadership, being able to build and...demonstrate how you would run a multi-subject level class." Mr. Nowell's pathway in taking on the challenge of developing this course would be considered voluntary, but it looks a little different than the pathways taken by other teachers. This is due to the nature of the school, which as the principal stated, provides "the flexibility to have a lot of student driven and teacher directed opportunities." In this situation, Mr. Nowell and a colleague came up with the idea of the hybrid course on their own. They then asked students if there would be any interest. Based on the positive response, they chose to offer the course, and were responsible for creating all of the curriculum.

*Leadership progression.* Mr. Nowell feels that he has progressed and become more involved in leadership as he has gained experience in teaching, stating that “as we all learn things, and get .... more competent, and develop more skills with teaching, that leadership just builds in small increments.” He added that he reflects on what has gone well in the classroom and tries to build on that.

*MSSE program impact on leadership development and progression.* He also related his leadership skill progression to his involvement in the MSSE program, stating the education courses helped develop his day to day skills as a teacher and helped him assess student learning in really “concrete ways, and my teaching methodologies got stronger.” Mr. Nowell also referenced the passion for outdoor courses that was sparked through his engagement in the MSSE program summer field courses. In speaking about the MSSE program, he said there were “practical things that made my teaching stronger,” but also “some revival of passion and excitement for learning.” He linked all of these benefits, which he attributed to the MSSE program, to his leadership development, stating “I think leadership can come out in a lot of ways with colleagues at a school, and I think one way is just being excited about teaching.”

Mr. Nowell also related his ability to impact the outdoor course program to his experience with the MSSE program, stating that the “courses that I took at MSSE, the field courses mostly, were so inspiring and I realized how fun and interesting they were....and I work in a place where I can try and do some of that same stuff here.” He felt that his involvement in the MSSE program helped him to build his confidence, feel stronger about his teaching, and reflect on his teaching. He felt he benefited from

working with a group of science teachers, both online and in person, stating that it was “powerful” meeting with so many science teachers and being able to learn from them. He supported this view when talking about the capstone project, stating that he felt that one of the best components of the capstone project was being able to learn from what others had done and being to get so many good ideas from them.

### Summary of Individual Case Studies

The 11 individual cases demonstrated the variety of situations in which teachers can be employed, and the variety of ways teachers can fill leadership roles. The individual case studies provided a view of what teacher leadership involvement looked like for eleven MSSE program graduates, and aimed to acknowledge the relation of the school and teaching situation context to how leadership is distributed and what leadership roles were available to teachers. While the focus of these case studies was on science teacher leadership, it must be acknowledged that several of the case study participants were serving in leadership roles that did not focus on science. There were different reasons for this in each of the case. In some circumstances, it was due to the needs of the school, which impacted the availability of leadership roles. In other cases, the reasons for serving in a non-science focused role had to do with the personal preference of the teacher leader. Table 30 shows the leadership roles participants filled grouped by whether the role focused on science or not.

Table 30  
*Science Leadership Roles and Non-Science Leadership Roles Filled by Case Study Participants*

Teachers with Main Leadership Role in Science	Leadership Role	Teachers with Main Leadership Role not in Science	Leadership Role
Mr. Marshall	Mentor science teachers	Mr. Semmler	Data Management
Mr. Nowell		Ms. Jessen	Assessment Coach
Ms. Minske	Develop outdoor science courses	Mr. Dirksen	Instructional Coach
Ms. Stahl		Ms. Akin	Literacy Lead
Mr. Tollefson	Develop laboratory instruction	Ms. Hoffer	Focus Team Lead
Ms. Ackerman	NGSS committee Department head, mentor science teachers Mentor science teachers		

The individual case studies provided a view of what teacher leadership involvement looked like for 11 MSSE program graduates and provided opportunity for in-depth analysis of the processes and pathways teachers were involved in as they moved into leadership roles. The individual cases also provided insight into MSSE program graduate's perception regarding the impact the MSSE program had on supporting leadership development and progression. The cases were organized by the extent to which the graduates felt the MSSE program supported their leadership development or progression, but were otherwise presented without significant analysis. Following the completion of writing the case study narratives, the results of the 11 cases were analyzed to identify themes existing across the case studies. Several themes were identified and will be discussed in the cross case analysis presented below.

### Cross Cases Analysis

First, a set of themes emerged that addressed research question one. These themes provided insight regarding the pathways teachers took as they moved into leadership roles. The 11 case studies revealed the subtleties that surround the actual processes teachers take in moving into leadership roles. A framework informed by the responses of these case studies was developed to provide a clearer vision of what a pathway into leadership may look like in response to different leadership roles. Secondly, a set of motivations that played a role in encouraging educators to take on leadership roles was identified. A third set of themes addressed the perceived leadership progression over the course of one's career. And lastly, themes evolved regarding the opportunities provided by and strategies and knowledge learned through the MSSE program which provided evidence of a perceived impact on leadership development and progression. The themes identified and a detailed description for each of these topics are discussed next.

#### Research Question 1: Pathways Taken to Move into Roles of Leadership

Through the cross-case analysis, research question 1 and 1a were addressed. Many of the individuals who participated in the case study were currently in multiple leadership roles. Pathways to leadership vary in the level of formality of the role, formality of the pathway taken to transition into the role, and how the pathway was initiated. The themes that emerged are shown in Table 31.

Table 31  
*Themes Supporting Research Question 1*

Theme	Research Question Addressed
Differentiating the formality of the role and pathway	1, 1a
Change in formality of role over time	1, 1a
Mode of pathway	1, 1a
Types of recruitment	1, 1a
Motivation to take on specific role	1b
Motivation to act a teacher leader	1b

Differentiating the Formality of the Role and Pathway. In the broadest sense, both the leadership roles and the pathways taken into leadership roles could be identified as formal or informal. Formal roles often included the assignment of tasks that are more well-defined and the roles tend to be linked to a more traditional leadership title, such as serving as a department chair, team lead, or instructional coach. Informal roles tended to involve a vague set of responsibilities or tasks to be undertaken. They may stem from a need identified by the teacher, such as informally helping other staff, and often do not include a formal title. Formal pathways often involved applying and interviewing for a specific role, whereas informal pathways involved teachers transitioning into a leadership role through an informal request or through their own initiative.

However, when individual leadership roles and their associated pathways were examined, variations in the relationship between the formality of the role and the formality of the pathway were discovered. Teachers may move into a formal role

through an informal pathway, indicating that the formality of the role and the formality of pathway taken to move into that role are not necessarily exclusive to one another. One example of this identified in the case study analysis is the pathway taken by Mr. Dirksen in moving into an instructional coaching role. Mr. Dirksen had had an informal conversation with his administrator about the instructional coaching role when the position became open. Through a casual conversation, the principal suggested to Mr. Dirksen that he fill the role. Mr. Dirksen opted not to fill the role the first year, but instead volunteered to help with some of the responsibilities. When he decided, one year later, to take on the role, he had to go through a formal channel to do so, applying and interviewing for the position. This example just goes to show that while this pathway would be considered an example of informal recruitment, this doesn't fully represent the subtleties involved in the process Mr. Dirksen took to take on the instructional coaching role.

It is also important to note that a given role may be more formal in one school and less formal in another. For example, some schools have a new teacher mentoring program in place. New teachers are assigned a mentor for a given period of time, and the mentor serves through a formal role which may include receiving a stipend for taking on the extra duties involved with mentoring. Other schools may not have a mentoring program in place, therefore teachers serving as mentors in those schools are doing so on an entirely voluntary basis. This is important to note because it indicates that it may not be appropriate to compare roles with the same title from one school to next, and that one

must request more information than the leadership role an individual fills if interested in the formality of the leadership role and the pathway taken to move into the role.

Change in Formality of Role over Time. Another factor to consider is how positions change over time. Through case study analysis, it was determined that in several situations, study participants became involved in a new initiative through an informal pathway. However, as the said initiative became part of the school's practice, these roles became more formal in nature, used a formal pathway, such as a formal assignment from an administrator, and sometimes included supplemental pay. Ms. Hoffer described an example of such a circumstance. As a novice teacher, Ms. Hoffer found herself being the only science teacher willing to participate in a training. The training was provided as an attempt to bring a new practice, professional learning communities, into the school. Through her willingness to informally participate in the training, she found herself involved in a committee. At the time when she volunteered to participate, the roles were filled voluntarily and were not linked to a stipend. However, the practice taken on by the professional learning community is now an ongoing practice in her school, and the pathway to participate in these roles is now through a formal assignment by principal nomination each year. While Ms. Hoffer initially moved into this role through an informal pathway, she has remained in the position for a number of years through a formal appointment.

Mode of Pathway. In considering the diversity of leadership role and pathway combinations that exist in reference to whether the role and pathway would be deemed

formal or informal, we complicate matters when adding a second type of pathway classification: mode of transition into pathway. The mode of transition further addresses the “how” part of research question one, in that it aims to identify how the individual moved into a role of leadership by indicating whether the individual was recruited for the role, assigned to the role, or volunteered themselves to the role. In the cross case analysis, it was observed that a much larger number of individuals indicated being recruited for roles or volunteering for roles. Very few cases indicated that they were assigned a role without any say on their behalf. Therefore, a brief discussion of the themes of recruitment volunteering that emerged will be discussed below.

Types of Recruitment. Other factors that were discovered in the analysis of the leadership roles case study teachers filled and the narratives behind how they transitioned to such roles was in regards to their recruitment. Several case study participants shared stories about being asked by an administrator in a one-on-one conversation if they would be willing to take on a specific leadership role. In Mr. Semmler’s situation, he was recruited through a process in which he was actually provided with a choice between two roles, as he described saying “There were a couple options...on the table” and that he was asked “Do you want to consider either head of math, or do you want to consider this option?” which was the head of data management position. This one-on-one conversationally based recruitment was considered by this researcher to be an example of direct recruitment. When using direct recruitment, the administrator has a person in mind they would like to fill the role, and they extend the invitation informally. A second classification was observed, indirect recruitment. In indirect recruitment, the

administrator extends the opportunity as a blanket statement to many individuals in an open setting, such as at a staff meeting, by using a statement like “if anyone is interested or would like to be involved...” This type of recruitment was mentioned by both Mr. Minske and Ms. Stahl, stating that opportunities are often presented to staff, and that whomever is interested can take part. This is interesting in examining pathways to leadership, because although the administrator is using an indirect form of recruitment, no individual teacher is singled out for the role. Therefore, while teachers feel that they were made aware of the opportunity to be involved or were made aware of a need that existed, they ultimately had to volunteer.

Another observation that must be mentioned is the manner in which direct recruitment took place. Two themes emerged in examining cases that referenced recruitment as a pathway into leadership: those who were recruited through an informal conversation with an administrator in which the administrator brought up a potential leadership role, like the example provided in which Mr. Semmler was given two options, and those who were recruited to a role following a previous conversation with an administrator regarding a specific instructional strategy or interest in a certain type of curriculum. Ms. Stahl provided an example of this in discussing how she moved into a leadership role around performance-based grading, saying “I worked in a school in [state in the Pacific West] and we were just starting to do that...transitioning our report cards and accounting systems...So when I came here, just in talking to my principal when I was initially hired, we had some conversations about that.” She ended being on maternity leave for part of that school year, but when she returned, her principal

approached her and said “we’d like to try and bring more of this performance-based learning to our school and...you used a little bit of it in the past, so how can we...get your perspective on this?” In this case, it was the conversation that took place between Ms. Stahl and her principal that served as the initiating factor, which later resulted in a direct request to take on a leadership role. While both pathways could be considered informal recruitment, the differences are important to discuss as they provide a deeper level of understanding regarding how teachers move into leadership roles and how schools aim to distribute teacher leadership.

In order to better demonstrate the variations regarding relationships between the formality of leadership roles and pathways, and the mode used to initiate a pathway, a descriptive pathway framework, as shown in Table 32, was created. This framework does not intend to be fully inclusive or representative of all possible pathway and role combinations, but instead aims to provide likely combinations supported by evidence collected through the case studies. It should also be mentioned that the pathway taken by a certain teacher may not match the pathway they indicated on the survey. Pathways provided in this table were constructed by the researcher using the newly developed framework, and took all of the knowledge of the individual’s teaching and leadership situations into consideration.

Table 32  
*Descriptive Pathway Framework*

Pathways and Role Identified	Description of Pathway and Role	Case Study and Leadership Role That Demonstrates this	Monetary Aspect
FP-FR Formal pathway- Formal role	Teacher applied and interviewed for a role, or the teacher was appointed, nominated, or invited to participate in a role. Teacher remains active in this role through a formal manner.	Assessment coach (Jessen)	Role may be full time position.
IP-FP-FR Informal recruitment Pathway- Formal Pathway- Formal Role	Teacher is recruited informally, usually through direct recruitment by an administrator in a one-on-one conversation. Upon acceptance of role, teacher goes through a formal channel such as an application or interview and fills a formal role.	University Professor (Minske) Instructional Coach (Dirksen) Head of Data Management (Semmler)	Role may be full time position or if individual is still serving as a classroom teacher, includes stipend.
IP-SR Informal pathway- Semi- formal role	Teacher moves into role informally, often through recruitment, but also potentially by volunteering. Role is a semi-formal as it involves set tasks/expectations, but is open to teacher interpretation.	STEM fair (Akin) NGSS Committee (Stahl)	Role is semi-formal, in that there are expected outcomes, but teacher has freedom.

Table 32 Continued

FP-FR-IR Formal Pathway- Formal Role- Informal Role	Teacher moves into role through a formal channel, such as an appointment. The role is a formal role associated with a district program or organization. Teacher continues to provide support on a voluntary basis even after their involvement with the program or committee ends, the time allotment on their role comes to an end, or provides additional support above and beyond formally assigned duties.	Mentoring Providing Professional development presentations (Hoffer, Tollefson) Outdoor programming (Nowell) Mentoring new Teachers (Ackerman)	Formal role has stipend, teacher volunteers after term ends or does more than assigned duties dictate.
IP-IF-FR Informal volunteer Pathway- Informal Role- Formal Role	Teacher takes on role as an informal volunteer. The role is informal. Role later becomes incorporated into the formal workings of a school program or team, and becomes a formal role with a set of expectations.	Creating professional development (school newsletter: Hoffer) Activity based Assessment	Role began voluntarily, may evolve to include stipend
IP-IR Informal Pathway- Informal Role	Teacher takes on role as an informal volunteer. The role remains informal and on voluntary basis without specific organizational involvement such as a committee or administrator oversight.	Mentoring teachers (Marshall)	Role on volunteer basis, no stipend included

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Several examples regarding teacher leadership pathways have been discussed in order to answer the central research question: How do MSSE graduates move into roles of leadership? and to answer research question 1) What pathways do teachers take in moving into roles of leadership? and to answer research question 1a) Were educators recruited, self motivated, or assigned a role. The next set of themes sought to answer research question 1b) Were there any other motivators? These themes will be identified and discussed below.

Motivation to Take on Leadership Roles. Through cross case analysis themes regarding the motivators that led case study participants into leadership roles surfaced. These motivators helped to answer research question 1b, which focused on whether there were other motivators that encouraged teachers to move into leadership roles. Teachers cited motivators which could be split into two major categories: motivations that encouraged case study participants to take on the specific leadership roles that they currently filled, and motivations that propelled case study participants into leadership involvement in general. This section begins by examining the motivations that teachers specified as having triggered the transition to their current leadership role(s).

Motivation to Take on Current Leadership Roles. Patterns regarding the motivations individuals had that led them to take on current leadership roles were identified. Case study participants were motivated to move into their current leadership roles based on three main reasons: 1) a desire to influence change within their school, 2) a desire to change their personal teaching situation, and 3) to fill an observed need.

These three main patterns for taking on their current leadership role will be discussed.

There were other motivators individual participants shared that did not fit into one of the three categories. These will be briefly discussed as well.

*Wanted to be involved in driving change at school level.* The most commonly cited motivator that drove MSSE program graduates into leadership roles was a desire to make an impact and drive change at the science department, school, and district level. Ms. Ackerman indicated that she was motivated to take on a leadership role because she saw it as an “opportunity to be involved” while Ms. Hoffer indicated the “need to drive change” within schools. Ms. Stahl stated that she was motivated by “the driver in me and my own personality that wants things to happen faster than they are likely to.” All of the individuals who indicated being motivated by wanting to help drive change were focused on improving instructional practices and curriculum for students.

*Wanted a personal change.* Several individuals were motivated to take on their current leadership role as a means to meet a personal need for change. Ms. Jessen was in a work situation that was incredibly overwhelming and even following her request to better balance the work load between science teachers, found herself bearing the brunt of the rigorous and demanding IB courses. Mr. Dirksen was in a similar situation, finding himself, after having a year long opportunity to teach science all day, thrown back into the demanding role of preparing for multiple disciplines covered in an elementary classroom while trying to incorporate the common core standards. Ms. Minske voiced less dissatisfaction with her teaching position, but did acknowledge that teaching middle school students was just not a great fit for her, and the opportunity to work with college

level biology students seemed to be a much better fit. Her administrator also alluded to how challenging of a school it was to work in, with the students living in generation poverty and requiring a significant amount of support. He disclosed that he had since taken a position in another district as well.

*Observed a need.* The third motivator that emerged was the need-based motivator. Both of the individuals that reported motivations to take on leadership roles that fit into this category had a great deal of teaching experience. Mr. Tollefson was motivated to take on leadership roles in his science department following the retirement of several veteran staff. He stated that following the retirement of the experienced science teachers, other staff started wondering “Who do we look to? Where do we go?” He saw the need and recognized that “somebody’s got to do it, and I’m qualified.....and me accepting that I’m qualified to do that.” Mr. Marshall also responded in a manner that referenced filling a need and providing support to novice teachers. One of his leadership roles was mentoring new science teachers. He responded that he was motivated to do so as a means to “take down barriers so my colleagues can feel like they’re colleagues and not like they’re isolated.” He added that he has taken this role on because “the school doesn’t really provide this.”

*Other motivators.* Several individuals provided motivators that did not fit into the other themes. Ms. Akin wanted was motivated to help coordinate the STEM fair because she wanted to stay involved in science despite being assigned to non-science roles. A large portion of Ms. Akin’s teaching roles and leadership roles were focused on literacy. Her assignment to literacy was need-based and was linked to the need to best serve the

demographics of the students her urban school served. While she was willing to take on the responsibilities associated with teaching literacy and working on the literacy team for the sake of her school and her students, her motivation to be involved in the STEM fair came from a personal desire to “use her degree” and stay involved in science education. Mr. Semmler was motivated to take on the head of data management role because he “thought of it in terms of career advancement,” felt that it would “provide a better career path” and would be something new and challenging.

Motivation That Propelled Teachers into Leadership in General. In reference to motivation, the second main theme that teachers identified was the motivators that encouraged teachers to participate in leadership in general. The patterns identified for this theme could be grouped as stemming from an internal motivator or stemming from an external motivator. These patterns and examples will be discussed.

*Internal motivators.* Motivators that were considered to be internally focused included having personal drive or motivation, a desire to impact student learning, and observing an increase in one’s confidence or skills. Several case study participants indicated that they were motivated to be involved in teacher leadership as whole based on their own drive or motivation. Ms. Stahl, Mr. Marshall, and Ms. Ackerman all cited personal motivation as the component motivating them to be involved in teacher leadership. Mr. Dirksen and Ms. Hoffer identified wanting what is best for students as the component motivating them to be involved in teacher leadership. Finally, Ms. Akin and Mr. Nowell identified observing an increase in confidence or skills as the factor that motivated them to be involved to teacher leadership.

*External motivators.* Motivators that were considered to be externally focused included receiving positive feedback from students based on instructional practices and observing a need for a leadership role to be filled. Both Ms. Minske and Ms. Jessen named feedback as a major motivator for moving into roles of leadership. Ms. Minske stated that “the feedback that I get from students” and seeing that her students “were just so engaged...that was a huge trigger.” Mr. Dirksen, Mr. Marshall, and Mr. Tollefson identified need being a motivator that caused them to be involved in leadership in general. Both Mr. Marshall and Mr. Tollefson had identified their motivation to take on their existing leadership roles as need based as well. While the increase in confidence and skills was grouped as an internally-focused motivator, it should be noted that both of the individuals who named this motivator as a support that boosted them into a leadership role also referred to the positive impact that the MSSE program had on increasing their confidence and developing their skills.

### Research Question 2: Leadership Progression

The leadership roles teachers filled, pathways taken to move into those roles, and the motivations driving leadership involvement have been discussed. Case study participants were also asked to reflect upon their leadership involvement and progression, which was the focus of research question 2. Question 2 focused on identifying how MSSE program graduates demonstrated progression in their involvement in leadership in general. All 11 individuals indicated that they had become more involved in leadership over the course of their career, and that their leadership involvement had progressed as they gained experience. Two main themes about leadership progression and involvement

were identified: an increase in leadership involvement and a progression of leadership skills. Increased leadership involvement examples included individuals reporting that they felt they were asked to participate more frequently in leadership roles or were asked to take on larger roles. Progression of leadership skill examples included individuals reporting that felt like they were more skillful, knowledgeable, or efficient.

Increased Involvement. Five of the 11 case study participants indicated that they had been asked to participate more frequently in leadership or were given more leadership opportunities. One example was Mr. Tollefson, who said that he has had more requests to work with student teachers as he has become more experienced. Another example was Mr. Semmler, who said that “you get different things handed to you.” Ms. Ackerman supported this, stating that she feels like she has progressed due to “the opportunities that have come up.”

Progression of Skills and Knowledge. The second theme that was identified was a progression of skills and knowledge. Four of the 11 case study participants indicated they felt they had become more skillful and knowledgeable over the course of their careers. Mr. Nowell that in regards to leadership progression, “as we learn things, and get...more competent and develop more skills with teaching, that leadership just builds in small increments.”

Research Question 3: Impact of MSSE  
Program on Teacher Leadership Development

In discussing the progression of the leadership over their teaching careers, many case study participants also implied that the MSSE program supported or contributed to their leadership development or progression. This addressed research question 3, which focused on the impact the MSSE program had on leadership development and progression, and also addressed question 3a, which focused on identifying the perceived supports provided by the MSSE program.

The individual case studies were organized and presented by the extent to which the individual felt the MSSE program impacted their leadership development or progression. Participants fell into one of three categories in regards to impact they perceived the MSSE program had on supporting teacher leadership and progression as is shown in Table 33 below.

Table 33  
*Case Study Participants Organized by Perceptions About Program Impact*

Extent to Which MSSE Program Supported Leadership Development or Progression	Case Study Participant
Neutral Impact	Ms. Hoffer Mr. Semmler Ms. Stahl
Indirect Impact	Ms. Jessen Mr. Tollefson Mr. Dirksen
Direct Impact	Mr. Marshall Ms. Ackerman Ms. Akin Ms. Minske Mr. Nowell

While three individuals reported feeling that the program had little or a neutral impact on supporting their leadership development and progression, all participants were able to report some experiences or benefits they perceived as a result of their involvement in the program. The themes identified were: increased confidence, opportunity to reflect on and assess teaching practices, improved instruction, improved science content knowledge, opportunity to collaborate and discuss with other science teachers, and opportunity to earn a master's degree. Each of the themes is briefly discussed.

MSSE Program Contributed to Increasing Confidence. An increase in or building of confidence was the most common response to what individuals acquired through their participation in the MSSE program. Seven of the case study individuals responded in this manner. Ms. Ackerman said that “it gave me a lot of confidence” and that she “walked away with a refined practice of why I do the things I do.” Mr. Tollefson referred to the MSSE program as a confidence builder” especially in regards to the science content. Mr. Dirksen stated that his involvement with the MSSE program “really helped boost my confidence...throughout both teaching and personal life as well.” Ms. Minske indicated that the program contributed to confidence in a way that helped her incorporate new things in her classroom, stating that “it’s certainly given me.... the confidence to try something new.”

Can Reflect upon and Assess Teaching Practice. Six of the 11 case study participants cited data collection and assessment skills learned from conducting action research for the capstone portion of the MSSE program as helping them reflect upon and

assess their instructional practices. Mr. Semmler identified the rigor of the capstone as serving as a support in developing teacher leadership, in that it asked him to be “really reflective on what it is that you’re doing .....and to provide evidence for what it is that you had done.” Mr. Dirksen felt there was a great deal of value in conducting action research as well, and felt that it supported his leadership development by giving him the opportunity to take on such a large research project and be challenged in the process. Mr. Nowell felt he benefitted most from the different types of assessment that were introduced as precursor to starting the action research, stating that “those were really meaningful for me.” Mr. Marshall talked about the impact that his capstone project has had on his chemistry classes, indicating the treatment he applied as part of the capstone research which resulted in an instructional practice that he continues to use and build upon. The treatment came about through reflecting on the practices he had been using in class and in reflecting upon what practices he would rather be incorporating.

Improved Instruction. Six of the case study individuals described a perceived increase in instructional skills, strategies, or ways to improve their instruction. Case study participants cited that they felt they had refined their practice and learned a variety of instructional strategies throughout the MSSE program. Ms. Ackerman referenced the variety of instructional resources she obtained through her participation in the MSSE program, and linked this to an increased variety in resources and tools used in her classroom.

Supplemented Science Content Knowledge. Four participants indicated that their participation in the MSSE program contributed to an increase in science content knowledge or supplemented their current knowledge. Ms. Stahl referenced the importance of taking higher level science courses and also appreciated being able to share more updated science content knowledge with her students. Mr. Dirksen referenced the field courses as being instrumental in increasing his science content knowledge and contributing to his ability to think analytically. Ms. Jessen also had a strong regard for the science courses, as she had come to education after working as an engineer. She stated that she “didn’t take all the same classes that all the other physics teachers had.” Her involvement in the MSSE program allowed her to select specific courses, such as special and general relativity, allowing her to supplement her physics knowledge.

Benefited from Discussion with Other Teachers. Four case study participants identified the opportunity to discuss teaching with other science teachers as having an impact on their leadership development or progression. Mr. Nowell indicated that he really enjoyed learning from other MSSE program participants, both in person and through the presentation of the capstone projects. Ms. Ackerman indicated that she really enjoyed having the opportunity to interact with so many other science teachers in a forum focused on teaching science.

Increased Leadership Opportunities by Providing Credential. Three case study participants indicated that the MSSE program provided a mechanism to earn the credential. Mr. Tollefson and Mr. Semmler indicated that having the credential opened

doors for them, as some of the leadership roles that they filled required participants to hold a master's degree.

Other Supports. Several other supports that were attributed to participation in the MSSE program were provided. Ms. Ackerman and Ms. Jessen both indicated that their participating in the program allowed them to provide better leadership. Ms. Ackerman stated that her involvement “allowed me to provide better leadership for my staff and the people I was mentoring.” Mr. Dirksen and Ms. Stahl both identified that through the program, they had learned new things that allowed them to speak with authority. Mr. Dirksen related this to the confidence he felt he gained through the program, stating that “building confidence over the.... two and a half years or so that I was in the program.... being able to.... learn something and then be able to talk with authority about that topic” was a big factor for him.

#### Suggestions for MSSE to Increase Support for Leadership Development

Taking into consideration that the MSSE program does not specifically focus on leadership development, case study participants were given an opportunity to provide suggestions for the program, with the focus on supporting leadership development and progression. The predominant response, with four of the 11 case study participants providing the suggestion, was to provide a leadership course with the intent to instruct teachers on how to take on leadership roles and teach or coach other teachers. Another common suggestion, with two of the 11 case study participants providing the suggestion, was to include a curriculum development course and provide a means to learn about the

NGSS. A third suggestion, which was put forth by two participants, was to require teachers in the program, during their educational coursework to document the leadership activities they had done in their own building and to seek feedback about a new practice from someone in their building. Other suggestions included encouraging MSSE program participants to publish their capstone projects, pairing MSSE program participants with a teacher leader, providing a way to keep MSSE program graduates connected such as through a list-serve, requiring MSSE students to be in charge of an activity during the summer sessions, asking students to think about what their leadership goal is, and creating a satellite campus to continue the facilitation of good teaching practices.

#### Summary of Cross-Case Analysis Results

Through the case study analysis, it was determined that participants more frequently moved into leadership roles through two modes: voluntarily or through recruitment by an administrator. Leadership roles and pathway relationships were identified, and it was determined that the formality of the role does not determine the formality of the pathway. Factors that motivated case study participants to take on both their current leadership roles and to participate in leadership in general were identified, and included personal drive, desire to be involved and drive change, having necessary experience and skills, and enjoying specific subject or tasks.

In regards to leadership progression, all 11 case study participants indicated that they felt they had become more involved in teacher leadership through the course of their career. When linking their progression back to the MSSE program, three case study participants reported that the MSSE program had not provided specific support in their

leadership progression or development, outside of the credential provided by the program. Three other case study participants indicated that the program indirectly, through an increase in confidence and science content knowledge, and through improved instructional strategies and assessment strategies supported their leadership progression and development. Finally, five case study participants indicated that the program had a direct impact on their leadership progression and development and provided specific examples and reasons of why they felt this way. Although three of the case study participants indicated that their involvement with the MSSE program had a neutral impact on the development and progression of their leadership skills, all 11 case study participants provided examples that indicated that the MSSE program provided a role or offered support towards their leadership development or progression in some way.

### Summary of Results

This study utilized a quantitative-qualitative design in order to answer the following research questions: 1. What pathways do teachers take in moving into roles of leadership? 1a. Were educators assigned a role, recruited, or self-motivated? 1b. What other motivations were involved? 2. How do MSSE program graduates demonstrate progression in their involvement in leadership? 3. How do MSSE program graduates perceive that the MSSE program contributed to a progression in their leadership involvement and/or development? 3a. What specific supports did the program provide? and 3b. Is there a relationship between MSSE program graduates' perception of the extent to which specific factors encouraged them to take on leadership roles and the

extent to which they perceived the MSSE program supported the development of these factors? This summary aims to merge all of the data collected in order to answer these research questions.

### Research Question 1

Research question 1, 1a, and 1b focused on the pathways taken by teacher leaders as they move into leadership roles. Research question 1 and 1a was answered in general by the survey, which indicated that the majority of the survey participants participated in leadership roles, and of that group of participants, most had either been recruited to a leadership role or had volunteered. The case studies provided additional information to answer the overarching question posed by this research, which was “How do MSSE graduates move into leadership roles?” Analysis of the case studies indicated that the ways in which MSSE graduates moved into leadership roles were numbered, nuanced, and that the contexts varied by individual and by school. In some situations, participants formally applied and were hired to more formal leadership roles, in others, they were recruited prior to formally applying for or being formally assigned a leadership role. In references to more informal roles, it was determined that in some situations, the teacher observed a need and chose to fill it without any oversight from an administrator. In other situations, the teacher observed the need and advocated for the change they wanted to see, in a sense creating a leadership role they would volunteer to fill.

The case study analysis also provided an answer to question 1b, which focused on identifying if there were specific motivators that encouraged teachers to take on leadership roles. Two main patterns emerged. Teachers were, in some cases, able to

provide specific reasons and motivations for why they chose to fill the specific roles they were filling. These motivators included wanting to drive change and make an impact at their school or district level, wanting a personal change or change in position at the school, and observing a need within their school. The second pattern addressed the specific reasons teachers provided explaining why they chose to be involved in leadership roles in general. These motivators were grouped as internal motivators and external motivators. Some of the internal motivators that teachers cited included being personally driven and motivated, having a strong desire to impact student learning, and having an increase in confidence and knowledge. Some of the external motivators given were that teachers had received positive feedback from their students about their practices and that teachers had observed needs within their school.

### Research Question 2

The survey indicated that participants demonstrated leadership skills, practices, and characteristics, as was discussed in the quantitative analysis section. However, the survey failed to provide direct evidence that indicated MSSE program graduates progressed in their leadership involvement. The survey asked graduates to indicate both the year they had graduated from the MSSE program and the year they had taken on leadership roles, and while many indicated they had taken on additional roles following their involvement in the MSSE program, a roughly equal number of participants indicated that they had been involved in leadership roles prior to their involvement with the program. This data did not directly support that program graduates progressed in their leadership involvement, but it should be noted that there were no responses that

indicated an individual had reduced their leadership role involvement or participation. The case study analysis provided some evidence to support question 2, as all 11 individuals indicated that they had become more involved in teacher leadership over the course of their career. Many individuals indicated that over time, they had been provided with more opportunities and larger leadership roles, as well as that they felt they had increased their leadership involvement due to an increase in knowledge and skills over the course of their careers in education.

### Research Question 3

Research question 3 focused on identifying whether the MSSE program supported or contributed to the development of or progression in teacher leadership. The survey indicated that a large percent of MSSE program graduates perceived the MSSE program had an impact on the development of several leadership practices and factors that have been identified as contributing to teacher leadership. The majority of survey participants indicated that their involvement in the MSSE program had an impact on their ability to stay current with research regarding best practices and effective professional learning, and a high percentage of survey participants indicated a perception that the MSSE program had an impact on their ability to model and articulate exemplary instructional practices. A high percentage of survey participants also indicated that the MSSE program had an impact on supporting the development of the following leadership factors: confidence in collecting and using data to drive instruction, confidence in using a variety of instructional strategies, increased competency as a science educator, and increased science content knowledge.

The case study analysis supported the survey findings and helped to answer research question 3a, which asked what specific roles or supports the program provided. The case study analysis indicated that case study participants perceived that the program supported their leadership development by helping them build confidence, providing them with opportunities to reflect on their instructional practices, increased their science content knowledge, and provided them with opportunities to discuss science education and collaborate with other science teachers.

The survey indicated in response to question 3b that there was a significant relationship between the extent to which four factors (increased competency as a science educator, confidence in collecting data, using a variety of instructional strategies, and using technology) encouraged survey participants to engage in leadership and the extent to which the MSSE program supported the development of those factors.

The results produced through the quantitative and qualitative methods of this study have been provided. These results will be further discussed in Chapter 5, in reference to the literature and the conceptual framework that guided this study.

## CHAPTER FIVE – DISCUSSION AND CONCLUSIONS

### Introduction

Chapter five provides a review of the significance and purpose of this study and a review of the problem and research questions. A brief overview of the literature review is provided as well. The conclusion section aims to address each of the research questions and provide evidence to inform each question. Implications of the findings of this study are provided and address how the findings of the study may be used to enhance the effectiveness of graduate programs that seek to support teacher leadership development. Limitations of this research and recommendations for further research related to the issues raised in this study are given.

### Significance and Purpose of the Study

Teacher leadership has been frequently discussed as a means to improve how schools function and as a way to improve the quality of instruction through distributed teacher leadership. A set of professional development programs were analyzed and through this and the review of other literature, several components that contribute to teacher leadership were identified. These components included but were not limited to:

- providing opportunities for reflection and problem solving
- increasing content knowledge
- increasing pedagogical knowledge
- providing opportunities for collaboration

The key research question of this study focused on describing pathways to teacher leadership. A review of the MSSE program was found to include three major components that support the development of teacher leadership. As such, this study collected data from MSSE program graduates to describe their perceptions of their teacher leadership development. Therefore, the significance of the study is that it identified the pathways science teachers often take in moving into roles of leadership and it explored the extent to which the MSSE program, a program that does not cite leadership development as one of its inherent goals, supports program graduates in their progression and development as teacher leaders. Considering the increased focus on teacher leadership over the last decade and the interest in using distributed teacher leadership to improve schools, the findings of this study may be of interest or importance to individuals interested in supporting the development of teacher leadership, to school administrators, pre-service education programs and graduate education programs. The findings of this study intended to fill gaps identified in the literature regarding teacher leadership development and the pathways teachers take to move into leadership roles.

The distribution of teacher leadership has been discussed as a means to improve schools and instruction. However, little is known about how schools go about distributing leadership and how teachers move into roles of leadership. York-Barr (2004) suggested identifying the paths by which teachers act as leaders. York-Barr (2004) also suggested identifying how they lead, whether it is formally or informally, as an area for further research. The clarification of the models, approaches, and forms of teacher leadership in practice was also cited as an area further research (Harris & Mujis, 2004).

Identifying how teacher leadership can best be developed and enhanced in the context of a specific professional development was also posed (Harris & Mujis, 2004; Harris & Spillane, 2008).

### Findings

The findings of this research were used to answer to following central research question: How do MSSE graduates move into roles of leadership?

The sub-questions were:

1. What pathways do teachers take in moving into roles of leadership?
  - 1a. Were educators assigned a role, recruited, or self-motivated?
  - 1b. What other motivations were involved?
2. How do MSSE program graduates demonstrate progression in their involvement in leadership?
3. How do MSSE program graduates perceive that the MSSE program contributed to a progression in their leadership involvement and/or development?
  - 3a. What specific supports did the program provide?
  - 3b. Is there a relationship between MSSE program graduates' perception of the extent to which specific factors encouraged them to take on leadership roles and the extent to which they perceived the MSSE program supported the development of these factors?

The survey provided findings which showed that the pathways most often used by teachers to move into leadership roles involved being recruited by an administrator or

volunteering themselves. The survey also demonstrated that there was a relationship between program graduates' perception of the extent to which four identified factors encouraged them to take on leadership roles and the extent to which the MSSE program supported the development of those four factors.

The case studies provided findings that support and further inform the literature about the pathways teachers take when moving into leadership roles. A variety in the types of leadership roles and the pathways used to move into those roles was identified and a tentative pathway framework was constructed. These findings are discussed in depth in the conclusions as they relate to research question 1. The case studies also provided insight into the motivations that encouraged teacher leaders to take on roles of leadership, which contributes to the knowledge of how teacher leadership is distributed. Distributed leadership was identified as a means to improve schools in response to the reform measures that have become common practice in schools in the United States (Darling-Hammond, 1997; Fullan, 1994; Rhoton & McLean, 2008). In regards to science education, distributed leadership was identified as a possible way to improve science instruction and ensure that science curriculum is aligned to standards (Rhoton & McLean, 2008). Through the case study analysis, evidence was gathered which supports the notion that teacher leaders can drive change at the school and district level. Many of the case study participants indicated being motivated to take on leadership roles by a personal desire to drive change, to ensure that the best practices for student learning are being used in their schools, and to ensure that curricular changes are being made to include the Next Generation Science Standards.

The case studies also indicated that teachers felt that the MSSE program provided supports that contributed to their development as effective science teachers. Many of the case study participants indicated feeling that the program improved their ability to use research-based instruction, assessment tools, increased their science content knowledge, and improved their ability to reflect on their instructional practices. While not all of the case study participants indicated that they perceived their involvement in the MSSE program as contributing to or supporting their leadership development or progression, all of the case study participants identified specific skills or characteristics they felt they gained or learned through their engagement with the MSSE program. Many of these skills and characteristics can be linked to the teacher development framework (Snell & Swanson, 2000), and will be discussed below as they relate to each research question.

### Conclusions

This section provides discussion about the results from this study for each of the research questions in reference to the literature, and the theoretical and conceptual frameworks that served to guide this research. Each of the research questions are addressed below.

#### Research Question 1

The findings of the survey indicated that 20% of participants were assigned to a role, 38% had been recruited, and 42% chose or volunteered to fill a role. While these results in some ways supported the pathways to leadership discussed in the literature (Murphy, 2007), these results failed to answer the questions posed by Harris and Mujiis

(2004), who called for a clarification of the models, approaches, and forms of teacher leadership in practice, and the question posed by York-Barr and Duke (2004), who identified the need for more knowledge regarding the pathways by which educators move into leadership roles. Murphy (2007) referred to the well-established role and the function based role, indicating that the leadership roles teachers tend to fill could be grouped by formality. While this view is true, the data gathered through the case studies brought to light a view that these terms may be oversimplified. This research supported the existence of formal and informal roles, but what emerged through the case study analysis was an observation that the leadership roles and the pathways teachers take to move into these roles can not be classified in such a simplified manner. This research provided evidence which indicated that the formality of the leadership role had no bearing on the formality of the pathway. These findings support a thought put forth by Baecher (2012), in that teachers may transition into formal roles through an informal request from an administrator. Also, the findings of this study indicated that both the leadership role and the pathway can fall on a spectrum in reference to formality, and that the designations based on the level of formality are subject to change for both the role and the pathway. Informal roles may become formalized as the role becomes a more integral part of the school culture or as support for a certain endeavor increases. These roles may then be attached to a formal pathway and a stipend.

The work by Baecher (2012) identified three potential pathways that could be taken by leaders as they move into roles of leadership. These pathways were the apprentice role, the participation role, and the self-help role. Baecher (2012) described

the apprentice role as looking very similar to the practices used to prepare teachers, in that pre-service teachers are provided with an opportunity to work under the guidance of a more knowledgeable teacher. The participation role was described as a pathway in which teacher leaders were provided with a limited amount of participation in a role, while being provided with an opportunity to observe others who were fully participating prior to assuming the full responsibilities of the role. Finally, the self-help role was identified as a role where teacher leaders navigate the tasks and responsibilities of the leadership role on their own. While the survey and interviews conducted for this research relied more on the formal/in-formal classification of pathways, the data collected through the case studies implied that very few teacher leaders were provided with the guidance and support that would serve to prepare them to move into their leadership role. This indicates that teacher leaders are being given leadership roles or are volunteering to take on leadership roles, and that once in these roles, are responsible for navigating the processes involved. This finding is of interest as the apprentice pathway is a mainstay of teacher preparation programs, and yet, when it comes to teacher leadership programs, is completely under-utilized. These findings have implications for teacher preparation programs as well as for professional development and graduate programs developed with the intent of providing support for teacher leadership development, and will be further discussed in the implication section below.

### Research Question 2

In order to answer research question two, the survey collected data in regards to the year MSSE program graduates took on leadership roles and the year they graduated

from the MSSE program as a means to demonstrate that MSSE program graduates demonstrated progression in their leadership involvement. It was determined that many MSSE program graduates were involved in leadership roles prior to their involvement in the MSSE program. However, many survey participants indicated they took on new or additional roles shortly after they completed the program. While the data collected from the survey in response to question two did not provide a conclusive answer regarding leadership progression, the data indicated that MSSE program graduates either maintained their current leadership involvement or increased their involvement in teacher leadership. There was no evidence that MSSE program graduates reduced their involvement in leadership roles.

In response to research question 2, the data from the case studies indicated that all eleven case study participants had taken on additional roles or had been provided with more opportunities to be involved as they gained professional experience. It is interesting to note that the years of experience of the case study participants varied, with some having as few as six years of experience, while others having over 20 years of teaching experience. This indicates that while teachers do tend to progress in their leadership involvement over the course of their career, being able to serve as a teacher leader in some aspect is not necessarily limited by teacher experience. Another point of interest in regards to leadership progression was that several of the case study participants who had less teaching experience indicated that they had served in leadership roles early in their teaching career because they had been willing to be involved when others had not. In one case study, the individual indicated that his leadership involvement had been limited for

many years due to working with several veteran science teachers who held or filled all of the leadership roles. This particular individual cited his motivation for being involved in leadership roles as stemming from a need, indicating that he was willing to fill roles that needed to be filled, but had not been searching for ways to be involved. In a contrasting situation, one of the case study participants explained how she had created a leadership role by advocating for a certain practice to take place in her school when she was a new teacher. These findings indicate that personal drive and initiative tend to play a bigger role in leadership involvement than years of experience do. Therefore, teacher leaders and administrators would benefit from identifying individuals interested in serving in teacher leadership roles early in their career in order to provide them with leadership opportunities and to support their leadership development.

### Research Question 3

In response to research question three, the survey indicated that MSSE program graduates felt their competency as an educator, having a strong science content knowledge, having confidence and self-efficacy in using a variety of instructional strategies, and knowing how to collect and use data to drive instruction encouraged them to take on leadership roles. These results supported the leadership factors identified in the literature, as teacher leaders are described as having a mastery of content knowledge (Leithwood, 2001) and expertise in teaching pedagogy (Nolan & Palalazzo, 2010). These findings also support the study done by Snell and Swanson (2000), as the findings from the survey supported and aligned with the dimensions of leadership put forth by their leadership development framework.

Question three also aimed to address whether the MSSE program provided support or contributed to leadership progression or development. Several professional development programs, including the MSSE program, and other literature were examined in order to determine what factors and components best contribute to leadership development. While the MSSE program did not indicate on the program webpage that the program set out to develop teacher leadership as one of the program's main goals, through the examination of program offerings done by this researcher and through an extensive literature review, a set of components that had the potential to support leadership development was identified. These components included:

- Critical reflection and problem solving
- Increased content knowledge
- Increased pedagogical knowledge
- Collaboration within a community of practice
- Having a clear definition of leadership

The results of this research indicated that all of these components except having a clear definition of leadership were identified as ways the MSSE program supported leadership and progression. Of these five components, four of them aligned with the conceptual framework designed by Snell and Swanson (2000). Only the last component, having a clear definition of leadership did not directly apply to the dimensions put forth in this framework. Because the components identified by this research meshed so well with those dimensions identified in Snell and Swanson's framework, the findings were discussed in relation to the leadership development conceptual framework. The survey

findings and case study findings provided evidence that indicated that the MSSE program provided opportunities which supported all four dimensions of the framework. The evidence provided by the survey data and the case study data in relation to the dimension(s) that were supported is shown in Table 34, and serves to confirm the conceptual framework put forth by Snell and Swanson (2000).

Table 34

*Evidence for Support of Leadership Dimensions from Survey and Case Studies*

<b>Teacher Leadership Development Framework Dimensions</b> (Snell & Swanson, 2000)	<b>Findings from Survey</b>	<b>Findings from Case Studies</b>
<u>Expertise</u> Fueled by a passion for their subject area, expertise in teaching requires deep pedagogical content knowledge. These teachers have a keen understanding of their students’ cognitive and developmental capacities and they are skilled at creating varied and rich curriculum to motivate and challenge their students. Expert teachers understand the goals or standards that must be met—they are able to analyze where their students are now and where they need to go. They can break their teaching down into manageable and well-sequenced mini-lessons to scaffold student learning towards meeting learning goals. These teachers are marked by a commitment to rigor and high expectations for themselves and their charges. Expert teachers seek out on-going opportunities to enhance and refine their craft.	<p>Increased science content knowledge</p> <p>Knowledge about instructional strategies</p> <p>Knowledge about collecting and analyzing data</p> <p>Demonstrates commitment to reaching higher standards and readiness to take action to improve.</p>	<p>Increased science content knowledge</p> <p>Increased knowledge of instructional strategies</p> <p>Improved instruction</p>

Table 34 ContinuedCollaboration

Characterized by a high degree of collegiality and cooperation, collaborative teachers value consensus and compromise rather than competition. They recognize that collective expertise offers the possibility of generating optimal solutions to the complex problems of teaching and learning. Such teachers demonstrate strong communication skills, such as inquiry and active listening. Collaborative teachers position themselves to be purposefully accessible to their students and peers.

Facilitate open dialogue

Teach and model changes in teacher practices

Uses effective strategies to facilitate positive change.

Discuss science and collaborate with other science teachers

Reflection

Reflective practitioners are able to discern what is happening in the classroom and adapt their efforts by understanding the perspectives of others, while at the same time, being conscious of their own values, thoughts, and biases. Committed to improving one's teaching by using reflection as a vehicle towards change, reflective teachers are willing to ask themselves, "how can I change to improve this situation?" Or, "what can I do differently?" thus requiring a high degree of agency and personal responsibility. Such practitioners are committed to entering into reflective dialogue with their colleagues as a regular component of professional lives.

Has accurate picture of one's self in terms of strength, values, philosophy, and behaviors.

Use data to drive instruction

Reflect on practice

Collect data and assess what is working

Table 34 Continued

<u>Empowerment</u> Empowered teachers are confident in their ability to make a difference in student learning. They exhibit a high degree of agency through their willingness to take risks and to “step up to the plate,” and their resourcefulness as problem solvers. Teachers who are empowered are characterized as optimistic, determined, and self-actualized. At the highest levels, these teachers are skilled in empowering others.	Confidence in collecting data  Confidence in using a variety of instructional strategies  Increased competency as a science instructor  Demonstrates commitment to reaching higher standards and readiness to take action to improve.	Confidence in self as teacher  Confidence in science content knowledge  Confidence in instructional strategies
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In the study conducted by Snell and Swanson (2000), it was determined that the four dimensions, while all serving an important role in supporting the development of teacher leaders, did not have an equal impact on leadership development. In general, teachers were more likely to serve in leadership roles if they exhibited the traits represented in the four dimensions. However, Snell and Swanson (2000) indicated that weakness in the content knowledge dimension did not necessarily prevent an individual from acting as a leader, but that individuals who demonstrated fewer of the characteristics associated with the empowerment dimension were less likely to be involved in leadership roles. The findings from the survey and the case study indicated that the MSSE program had an impact or provided support for all four of the dimensions, including empowerment. Not all case study participants indicated that the program made an impact

or contributed to each of the four dimensions represented in the framework, but through the aggregation of survey and case study data, there is evidence that the program provided support for all four dimensions.

### Implications for Teacher Leadership Theory

Several implications for theory were realized through this research. This research aimed to identify the pathways that teachers take to transition into leadership roles. The pathways and processes involved in moving teachers into roles of leadership also provide a better understanding about how schools go about distributing teacher leadership and will be discussed in this section.

Distributed Leadership. The theoretical implications of this study in regards to distributed leadership stem from the work done to better identify the pathways through which teachers move in order to take on leadership roles. While Spillane et al. (2004) cited the school as an appropriate unit of analysis for studying distributed leadership, Halverson & Clifford (2013) argued that another approach is to begin with the tools that leaders indicated as being central to their work. The case studies utilized in this research focused on the individual teacher level rather than leadership practices at the school level, but overall, focused on the MSSE program. Interviews with individual teachers provided a view into the inter-relationship between these teachers and other members of their staff, and were supported by the interviews of their principals. Furthermore, while each of the 11 case studies provided a view of what leadership may look like for a specific individual, one must consider how the leadership role is situated in the context of what

the individual wishes to and can contribute, and how the leadership role is situated within the context of the community, school district, and school building. All of these factors played a contributing role in regards to the individual teacher leader's involvement in leadership in their teaching situation. The distributed leadership theoretical framework allowed for individual cases to be analyzed in a manner that was inclusive of the context, and considered that much of what happens in schools relates to a bigger context. In public schools, for example, certain courses are often prioritized over others as a response to high-stakes testing. Schools serving populations with higher numbers of at-risk, poverty-stricken, or English Language Learner students may use practices or programs that look very different than those used in schools that serve populations with higher educational backgrounds and higher socioeconomic status, therefore allowing for different distributed leadership opportunities, practices, and leadership roles.

Pathways and Distributed Leadership. Situated within the distributed leadership frame of reference, care was also taken to acknowledge the pathways that indicate how teacher leaders move into or take on these distributed leadership roles, and the context in which these pathways are situated. An important implication for theory is a better understanding of the pathways that teachers take to move into roles of leadership. This research was able to gather case study data to provide a better understanding of the pathways that teachers take and the context of those pathways in regards to how leadership is distributed at individual schools.

*Relationship between role and pathway.* This research was able to put forth a framework that addressed the relationships observed between the formality of the

leadership role and the formality of the pathway. This research was also able to provide support for Baecher (2002) in that transitions into formal roles often stem from a request made by an administrator or another teacher leader. The findings of this research support that while many of the case study participants served in formal roles, the pathway to that role was initiated by an informal discussion with an administrator. The majority of case study individuals had been recruited to take on their leadership position.

In regards to the pathways that were taken to involve individuals in leadership roles, the survey utilized three pathways. However, in discussion with the case study participants, few participants indicated that they were assigned a role without any say on their behalf. This observation is important in that it provides support for the notion of distributed leadership, in that the leadership practices of a school are community-based and rely on collaboration between different actors rather than from a direct order of an administrator (Halverson & Clifford, 2013; York-Barr & Duke, 2004). Another implication for distributed leadership theory is the themes identified in reference to the recruitment pathway mode. Two themes emerged: those who were recruited through an informal conversation with an administrator in which the administrator brought up a potential leadership role, and those who were recruited to a role following a previous conversation with an administrator regarding a specific instructional strategy or interest in a certain type of curriculum. While both themes could be considered informal recruitment, these themes provide a better understanding of how teachers move into leadership roles and how schools aim to distribute teacher leadership.

While somewhat outside the scope of this research, these findings indicate that the relationships teachers have with building administrators play a large role in supporting the movement of teachers into leadership roles, and that a negative relationship with an administrator may serve as barrier to leadership. It also supports the notion that through communication and collaboration of teacher leaders and school administrators, distributed teacher leadership can be incorporated into schools in a way that places individuals in the roles where they have the ability to make the most impact. In addition, when examining the motivators that encouraged teachers to fill specific leadership roles, teachers were often motivated by a desire to drive instructional or curricular change within their schools. This supports the work of Halverson & Clifford (2013) on distributed leadership, in that instructional leaders or teacher leaders are able to make an impact to improve student learning.

*Social-aspect.* Spillane & Diamond (2007) developed three paths that aid in describing the social aspect of leadership distribution: 1) collaborated distribution, in which multiple individuals engage simultaneously in tasks, 2) collective distribution, in which individuals divide tasks across roles, and 3) coordinated distribution, in which leaders construct complex organizational routines in which multiple teacher leaders can then engage. Many individuals indicated collaborative distribution, in that they were involved in multiple leadership roles and activities. Many individuals also exhibited involvement in collective distribution or coordinated distributing, in that teachers were active in a leadership role through participation in a committee or a team. It is difficult to determine whether the work of the participants who served on committees or teams

would be classified as collective or coordinated as more information about the workings of these groups would be required. This is an area that would benefit from further research.

### Implications for Programs

Teacher responses in regards to whether the MSSE program had supported their leadership development and progression were interesting in that teachers provided examples of what they felt had an impact. These findings support much of the literature regarding factors that contribute to leadership development.

One of the factors put forth in the literature (Zinn, 1997) as an important component in supporting the development of teacher leadership is providing teachers with a clear definition of what leadership is and what leadership roles are possible. The research in this study supported this view, as the researcher encountered occasions where individuals seemed to focus solely on formal leadership roles and did not acknowledge roles that were more informal. When providing suggestions to the MSSE program in regards to how the program could better support the development and progression of teacher leadership, Mr. Nowell had an insightful response, stating that “the program could ask people what their leadership goals are in the course, like a self evaluation, so that they’ve thought about it during the program.” This is a valid suggestion, as there is a need to reconcile the discrepancy that exists between how leadership is defined in the literature and how it is defined by teachers (Zinn, 1997). Having had time to reflect upon what leadership means and how one might aim to serve as a leader may serve as an important component of any program hoping to support teacher leadership development,

as a lack of a clear vision and definition of teacher leadership has been identified as a barrier to teacher leadership (Zinn, 1997). The work done by Baecher (2012) supports this view, as the following suggestions regarding teacher leadership were proposed:

- familiarize teachers with teacher leadership options,
- assist teachers in making the transition to mentor or cooperating teacher, and
- assist teachers in how to conduct professional development for colleagues.

The first statement supports the view that teacher leaders should have a clear view of what leadership roles are available in addition to having a clear definition of teacher leadership. The following two statements provided by Baecher (2012) indicate that there is a need to provide assistance to teachers as they move into leadership roles.

In Need of Support for Teacher Leaders. Another implication for programs is the need to provide a means of support for teachers in developing their leadership abilities. There is evidence that teachers are not always prepared to assume the leadership roles they are asked to take on (Smyser, 1995). Murphy (2005) supported this view, and pointed out that little is done at the school and district level to overcome leadership skill deficiencies. Smyser (1995) identified lack of training as a major obstacle in establishing leadership, and suggested that education programs specifically train teachers to take on leadership roles. Baecher (2002) offered three pathways of leadership which focus on varied levels support offered to teacher leaders: apprentice, participation, and self-help. The apprentice pathway allowed for a teacher leader to work along side an expert. The participation model allowed the teacher leader to participate in a role in a reduced manner prior to taking on all of the responsibilities. The self-help pathway allowed the teacher

leader to participate in a leadership role, but with minimal support. Other than the traditional use of the apprentice model in preparing pre-service teachers, this research did not encounter examples in which participants were provided the support of an apprentice model. There was one example provided by a case study participant that seemed to match the participation model. This example was Mr. Dirksen, who chose to assist his principal with the instructional coach duties for one school year prior to taking on the role. However, in further examining the narrative he provided around this situation, his experience would be better classified as self-help pathway in that he offered assistance in the role more as a response to lighten the workload for his principal, than as a means to receive training and support. The rest of the examples of leadership provided by individuals participating in the case portion of the study seemed to fit under the self-help pathway, as the individuals did their best to fulfill the expectations, if serving in a role with formal expectations. These findings are important because they indicate that the majority of teacher leaders are taking on leadership roles without receiving adequate support or training.

Participants indicated that they felt they would greatly benefit from a course that taught them how to teach or mentor other teachers. The survey results and case study narratives indicated that the MSSE program provided opportunities that supported the development of many of the leadership dimensions listed in the framework posed by Snell & Swanson (2000). One dimension emerged in the research done by Snell and Swanson (2000) as having more bearing on whether teachers participated in leadership roles or not. This dimension was the empowerment dimension, which stated that teachers

have confidence in their abilities. Teachers were more likely to engage in leadership roles if they more fully represented this dimension. It is worth pondering Baecher's (2012) suggestions for teacher leadership development from this perspective, as teachers provided with opportunities to learn about how to teach and mentor other teachers would most likely feel more confident taking on roles that ask them to do so, hence improving the empowerment dimension as well as the pedagogical knowledge dimension.

### Practical Implications

Several practical implications emerged. The first was in regards to the framework posed by Snell and Swanson (2000). This researcher felt that the framework could be used in a prescriptive manner by teacher leaders and principals. The framework identified four dimensions that support teacher leadership, which could be used to identify teachers who exhibited signs of emerging leadership in reference to the four dimensions. Once identified, emergent leaders could be provided with opportunities to take on leadership roles, regardless of their years of experience, and could be provided with support in order to better facilitate the development of the skills needed to successfully serve as teacher leaders. Using this framework to identify emergent teacher leaders has the potential to improve instruction, student learning, and the school environment because when teachers are encouraged to actively engage in, contribute to, take responsibility for, and become accountable for what is happening in their schools, they are likely to become committed to these decisions and work diligently towards implementation. Further, the conversations between and the collaboration among

teachers serving in leadership roles unites teachers, creating a professional work environment (York-Barr & Duke, 2004).

Another practical implication that emerged from this research is that teacher leadership involvement may be a potential way to address teacher retention. York-Barr and Duke (2004) stated that providing teachers with leadership opportunities can improve teacher retention as it provides new opportunities for experienced teachers and allows teachers to become more involved, invested, and to have a direct impact on what is being done within their schools. Teacher leadership also acknowledges teacher's expertise and dedication, which serves to increase teacher retention by providing opportunities for advancement (Hart, 1995). Providing opportunities for teachers to be involved in leadership roles also creates a community-like environment in the work place. This has been identified as being of importance in recruiting Generation Y teachers, or those born after 1977 (Behrstock & Clifford, 2009). Behrstock and Clifford identified factors such as inadequate opportunities for advancement and feelings of being unprepared, conditions that could be addressed by teacher leadership, as factors that contribute to new teacher attrition (Behrstock & Clifford, 2009). Therefore, providing teacher leadership opportunities such as merit-based compensation, job rotation into other departments, opportunities for career advancement, and early career mentoring may be successful in recruiting and retaining teachers.

## Summary

### Limitations of Implications

Some limitations of the study were observed. One limitation that was discovered is that not all leadership roles were equally represented or reported by individuals. Informal leadership roles have the potential to be underrepresented in formal documents such as resumes, as individuals tend to list formal roles and titles but may be unsure how to report the roles they have taken on that are not linked to a formal title. A second limitation was the use of an administrator as a means of providing evidence in support for teacher leadership progression. While some administrators had worked with their respective case study teacher for a long period of time, many had not. This proved a limitation, as the administrator could not provide adequate evidence of teacher leadership progression as witnessed over a significant period of time.

### Recommendations for Future Research

In order to address the limitation regarding the use of an administrator as a means to collect data regarding teacher leadership progression, this researcher suggests studying leadership progression over the course of several years in order to allow for data collection at multiple points in time. This would better provide the picture of how novice teachers transition into teacher leader roles over the course of their teaching careers and would better identify the supports that helped teachers develop and progress as leaders. In this way, research could be positioned in regards to a specific professional development program, in that it could collect data prior to, during, and following participation in the program.

In addition to being able to provide a more accurate and in-depth description of how teacher leadership developed and progressed over a period of time, changes in leadership practices could be identified as well. This research was able to determine whether teacher leaders had taken on new or additional roles following the completion of the MSSE program, but was not able to discern how specific leadership practices had changed in response to their involvement in the program. This would be another area recommended for future research, as identifying the practices that changed and describing how they changed as a result of involvement in a professional development program would serve to support teachers in the development of their ability to serve as teacher leaders. This would also benefit the professional development program under study, as being able to provide specific examples and describe changes in leadership practices would serve to demonstrate the impact a program has on leadership progression.

A second recommendation for future research is to continue examining the pathways taken by science teacher leaders as they move into roles of teacher leadership, and to examine the factors leading up to these transitions. The concept of distributed leadership may play an important role in the advancement and improvement of science education and in improving education as a whole. Therefore, understanding how the relationships between teachers and administrators, teachers and the school community, and teachers and their own unique abilities affect the pathways and transitions into leadership roles is needed.

A third recommendation is to further examine and identify the social-aspect pathways associated with teacher leadership. This study aimed to provide in-depth

examples of teachers serving in leadership roles and asked both the case study participants and one of their principals to describe the leadership roles teachers filled and the work these roles entailed. However, this research did not deeply probe into the development or the workings of leadership teams or committees. This is an area suggested for future research in that it is important to better understand the workings of teams and committees, as both are utilized in schools and their workings may vary by focus and by school. It is also of importance to examine how leadership is distributed through a team or committee. Identifying the use of either collective distribution or coordinated distribution may provide a better understanding of how leadership is distributed among individual teacher leaders within teams and committees.

In closing, this research provided a more expanded view of the pathways that teachers take as they move into leadership roles, identified the motivators that propel teachers into these roles, and examined the extent to which the MSSE program, a master's degree program for science teachers, provided support to teachers in the development and progression of their teacher leadership abilities. Teacher leadership and distributed leadership have been long identified as a means to improve schools and this research served to provide more insight into how science teachers move into leadership roles and how leadership is distributed in different schools. This research also served to identify the specific factors and supports that were perceived by teachers as contributing to their leadership development. This research also uncovered the factors that motivated teachers to serve in leadership roles. Many of the case study participants indicated that they were motivated by personal drive and a desire to change and improve their school.

Personal drive seemed to have a greater influence on the extent to which teachers were involved in leadership than their years of experience did.

Looking forward, it is imperative that teacher leadership is further examined in order to identify the steps that can be taken to provide support for existing teacher leaders, and to determine how to best identify and support novice teachers who are motivated to take on leadership roles.

In addition, the adoption and implementation of the Next Generation Science Standards (NGSS), as well as the growing emphasis on science, technology, engineering, and math (STEM) programs, creates a huge need for involved science teacher leaders. Science teacher leaders are needed to facilitate the implementation of the instructional strategies called for by these new standards and programs, and to provide support for other science teachers as they make the transition to using more inquiry-based instructional methods. Science teacher leaders who are passionate about ensuring that the proper science content is taught, best instructional practices are used, and who are willing to lead others in making necessary changes and improvements in science curriculum and instruction will play an enormous role in improving science instruction in schools. Now is the time to examine how current science teacher leaders can be better supported in their various leadership roles and how the development of teacher leadership can be fostered and supported in novice science teachers in order to provide quality science instruction that prepares students to succeed in a rapidly changing world.

REFERENCES CITED

## References

*References marked with an asterisk indicate studies included in the meta-analysis.*

- Ackerman, R. & Mackenzie, S. (2006). Uncovering teacher leadership. *Educational Leadership*, 63(8).
- \*Archer, J. (2001). Teacher re-creation. *Education Week*, 20(16), 46–50.
- Baecher, L. (2012). Pathways to teacher leadership among English-as-a-second-language teachers: professional development by and for emerging teacher leaders. *Professional Development in Education*, 38(2), 317-330, DOI: 10.1080/19415257.2012.657877
- Barth, R. (2001). Teacher leader. *Phi Delta Kappan*, 82(6), 443-449.
- Bassey, M. (1981). Pedagogic research: on the relative merits of search for generalisation and study of single events. *Oxford Review of Education*, 7, 73-93.
- Behrstock, E., & Clifford, M. (2009). Leading gen Y teachers: Emerging strategies for school leaders. Retrieved from <http://www.tqsource.org/publications/February2009Brief.pdf>.
- \*Berry, B., & Ginsberg, R. (1990). Creating lead teachers: From policy to implementation. *Phi Delta Kappan*, 71, 616–621.
- Blase, J., & Blase, J. (2006). *Teachers bringing out the best in teachers: A guide to peer consultation for administrators and teachers*. Thousand Oaks, CA: Corwin Press.
- Boeije, H. R. (2002). A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Quality and Quantity*, DOI: 10.1023/A:1020909529486
- Bybee, R. (2006). The National Science Education Standards: Personal reflections. *School science and mathematics*, 106(2), 57-63.
- Clotfelter, C.T., Ladd, H.F., & Vigdor, J.L. (2007). *How and why do teacher credentials matter for student achievement?* Retrieved from the National Center for Analysis of Longitudinal in Education Research website: [www.caldercenter.org](http://www.caldercenter.org).
- Creswell, J.W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches*. Thousand Oaks, CA: Sage Publications.

- \*Crowther, F., Kaagen, S. S., Ferguson, M., & Hann, L. (2002). *Developing teacher leaders: How teacher leadership enhances school success*. Thousand Oaks, CA: Corwin Press.
- Darling-Hammond, L. (1997). *National commission on teaching and America's future: Final progress report*. New York, NY: Teachers College, Columbia University.
- \*Darling-Hammond, L., Bullmaster, M. L., & Cobb, V. L. (1995). Rethinking teacher leadership through professional development schools. *Elementary School Journal*, 96, 87–106.
- Darling-Hammond, L., & McLaughlin, M. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan*, 76(8), 597-604.
- \*Devaney, K. (1987). *The lead teacher*. New York: Task Force on Teaching as a Profession, Carnegie Forum on Education and the Economy.
- Ecans, L. (2014). Leadership for professional development and learning: enhancing our understanding of how teachers develop. *Cambridge Journal of Education*, 44:2, 179-198.
- EEL: English, Fenwick W. (2006). "Leadership, Teacher" in *Encyclopedia of Educational Leadership and Administration*. 583. Retrieved from Thousand Oaks: Sage Publications. Credo reference. 8 Jan. 2010.
- Eckert, J., Ulmer, J., Khachatryan, E., & Ledesma, P. (2015). Career pathways of teacher leaders in the United States: adding and path-finding new professional roles. *Professional Development in Education*. DOI: 10.1080/19415257.2015.1084644
- Epstein, L. (2012). Survey monkey.
- \*Fessler, R., & Ungaretti, A. (1994). Expanding opportunities for teacher leadership. In D. R. Walling (Ed.), *Teachers as leaders* (pp. 211–222). Bloomington, IN: Phi Delta Kappa Educational Foundation.
- Fullan, M. (1995). Contexts: Reflections and implications. In O'Hair, M.J., *Educating teachers for leadership and change: Teacher education yearbook III* (pp.1-9). Thousand Oaks, CA: Corwin Press.
- Garet, M., Porter, A., Desimone, L., Birman, B., & Suk Yoon, K. (2001). What makes professional development effective: Results from a national sample of teachers. *American Educational Research Journal*, 38(4), 915-945.

- Germuth, A. (2012). *Empowering teacher leaders: The impact of graduate programs connecting mind, brain, and education research to teacher leadership*. Prepared for BrainSmart.
- Goldhaber, D.D. & Brewer, D.J. (1997). Evaluating the effect of teacher degree level on educational performance. In W.J. Fowler Jr. (ed.), *Developments in school finance*, 1996 (pp.197-210). Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Greenlee, B.J. (2007). Building teacher leadership capacity through educational leadership programs. *Journal of Research for Educational Leaders*. 3(1), 44-74.
- Gronn, P. (2002). Distributed leadership as a unit of analysis. *The Leadership Quarterly*. 13(4), 423-451, doi:10.1016/S1048-9843(02)00120-0
- Guba, E.G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology*, 29, 75-91.
- \*Guiney, E. (2001). Coaching isn't just for athletes: The role of teacher leaders. *Phi Delta Kappan*, 82, 740-743.
- Guskey, T.R. (1995). *Professional development in education: In search of the optimal mix*. In T. Guskey & M. Huberman, eds. *Professional development in education: new paradigms and practices*. New York: Teachers College Press, 114-131.
- Guskey, T. (2002). Does it make a difference? Evaluating professional development. *Educational Leadership*, 59(6), 45-51.
- Guskey, T. (2003). Professional development that works: What makes professional development effective? *Phi Delta Kappan*. June.
- Guskey, T. (2003). Analyzing lists of the characteristics of effective professional development to promote visionary leadership. *NASSP Bulletin*, 87(637).
- Hallinger, P., & Heck, R. (1996). Reassessing the principal's role in school effectiveness: A review of empirical research. *Educational Administration Quarterly*, 32(1)5-44.
- Halverson, R., & Clifford, M. (2013). Distributed instructional leadership in high schools. <http://website.education.wisc.edu/halverson/wp-content/uploads/2012/09/110411-Halverson-Clifford.pdf>
- Hanuscinng, D. L., Rebello, C. M., & Sinha, S. (2012). Supporting the development of science teacher leaders-where do we begin? *Science Educator*. (21)1.

- Harris, A., & Muijs, D. (2005). *Improving schools through teacher leadership*. Maidenhead: Open University.
- Harris, A. & Spillane, J. (2008). Distributed leadership through the looking glass. *Management in Education*, 22(1), 31-34. DOI:10.1177/0892020607085623
- Harrison, C., & Killion, J. (2007). Ten roles for teacher leaders. *Educational Leadership, Association for Supervision and Curriculum Development*.
- \*Hart, A. W. (1995). Reconceiving school leadership: Emergent views. *Elementary School Journal*, 96, 9–28.
- Hawley, W.D., & Valli, L. (1999). The essentials of effective professional development: A new consensus. In L. Darling-Hammond & Sykes (eds.), *Teaching as the learning profession: Handbook of policy and practice* (pp.127-150). San Francisco: Jossey-Bass.
- \*Heller, M. F., & Firestone, W. A. (1995). Who's in charge here? Sources of leadership for change in eight schools. *Elementary School Journal*, 96, 65–86.
- \*Henson, K. T. (1996). Teachers as researchers. In J. Sikula, T. J. Buttery, & E. Guyton (Eds.), *Handbook of research on teacher education* (2nd ed., pp. 53–64). New York: Simon & Schuster.
- Hunzicker, J. (2010). Professional development and job-embedded collaboration: How teachers learn to exercise leadership. *Professional Development in Education*. 32(2), 267-289.
- Kennedy, M. (1998). Education reform and subject matter knowledge. *Journal of Research in Science Teaching*, 35(3), 249-263.
- Kennedy, M. (1999). Form and substance in mathematics and science professional development. *National Institute for Science Education Brief*, 3(2),1-7.
- Klentschy, K. (2008). Developing teachers leaders in science: Attaining and sustaining science Reform. *Science Educator*, 17(2).
- Koellner, K., Jacobs, J., & Borko, H. (2011). Mathematics Professional Development: Critical features for developing leadership skills & building teachers' capacity. *Mathematics Teacher Education and Development*, 13.
- Kurtz, S. (2009). Teacher leadership: Teacher leaders can be key to a school's success in achieving goals for students. *Leadership*. 39(1).

- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, England: Cambridge University Press.
- Laverty, S. M. (2003). Hermeneutic phenomenology and phenomenology: A comparison of historical and methodological considerations. *International Journal of Qualitative methods*, 2(3). Retrieved from [http://www.uablerta.ca/~iiqm/backissues/2\\_3final/html/laverty.html](http://www.uablerta.ca/~iiqm/backissues/2_3final/html/laverty.html)
- Leithwood, K., Steinbach, R., & Jantzi, D. (2002). School leadership and teachers' motivation to implement accountability policies. *Education Administration Quarterly*, 38(1), 94-119.
- Lieberman, A., & McLaughlin, M.W. (1992). Networks for educational change: Powerful and problematic. *Phi Delta Kappan*, 673-677.
- Lieberman, A., & Miller, L. (Eds.). (1991). *Staff development for education in the 90's*. New York: Teachers College Press.
- Lieberman, A. & Friedrich, L. (2007). *Teacher Leadership: Developing the conditions for learning, support, and sustainability*. in A. Hargreaves et al (Eds.) second international handbook of educational change. Springer International Handbooks of Education 23.
- Little, J. W. (2003). Constructions of teacher leadership in three periods of policy and reform activism. *School Leadership and Management*, 23, 201-419.
- Massell, D. & Fuhrman, S.H. (1994). *Ten years of state education reform: Overview with four case studies*. New Brunswick, NJ: Rutgers University, Consortium for Policy Research in Education.
- Mayer, D & Lloyd, M. (2011) Professional Learning: An introduction to the research literature. *Australian Institute for Teaching and School Leadership*.
- McCarthy, J. & Young, M. (2001). The seamless web: The role of graduate teacher education programs in continuous teacher development. *Action in Teacher Education*, 23:2, 9-17.
- Mihans, R. (2008). Teaching: a developing profession: can teachers lead teachers? *Phi Delta Kappan*, June 2008.
- Montana State University. (n.d.) MSSE degree program. Retrieved from <http://www.montana.edu/msse/prospective-students/degree-program.html>

- Montana State University. (n.d.) Mission, vision, and goals. Retrieved from <http://www.montana.edu/msse/index.html>.
- National Research Council. (1996). *National science education standards*. Washington, DC: National Academy Press.
- National Science Teachers Association. (2003). *Position Statements: Leadership in science education*. Retrieved from <https://www.nsta.org/about/positions/leadership.aspx>
- NGSS Lead States. (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.
- Nolan, B., & Palazzolo, L. (2011). New teacher perceptions of the “teacher leaders” movement. *NASSP Bulletin*, 95(4).
- Northern, T.K., & Bailey, G.D. (1991). Instructional leaders for the 21<sup>st</sup> century: Seven critical characteristics. *Educational Consideration*, 18(2), 25-28.
- OECD (Organisation for Economic Cooperation & Development). (2009). *Creating effective teaching and learning environments: First results from TALIS (Teaching and Learning International Survey)*. Paris: OECD
- Patton, M., Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage Publications.
- \*Paulu, N., & Winters, K. (1998). *Teachers leading the way: Voices from the National Teacher Forum*. Washington, DC: U.S. Department of Education.
- Rhoton, J., & McLean, J. (2008). Developing teacher leaders in science: Catalysts for improved science teaching and students learning. *Science Educator*, 17(2), 45-56.
- Ross, D. Adams, A., Bondy, E. Dana, N., Dodman, S. & Swain, C. (2011). Preparing teacher leaders: Perceptions of the impact of a cohort-based, job embedded, blended teacher leadership program. *Teaching and Teacher Education*, 27. 1213-1222.
- Roth, R.A. (1986). *Teaching and teacher education: Implementing reform*. Bloomington, IN: Phi Delta Kappan Educational Foundation.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22, 63-75.

- \* Sherrill, J. A. (1999). Preparing teachers for leadership roles in the 21st century. *Theory Into Practice*, 38, 56–61.
- \*Silva, D. Y., Gimbert, B., & Nolan, J. (2000). Sliding the doors: Locking and unlocking possibilities for teacher leadership. *Teachers College Record*, 102, 779–804.
- Smylie, M. A. (1995). New perspectives on teacher leadership. *The Elementary School Journal*, 96, 3–7.
- \* Smylie, M. A., & Denny, J. W. (1990). Teacher leadership: Tensions and ambiguities in organizational perspective. *Educational Administration Quarterly*, 26, 235–259.
- Snell, J., & Swanson, J. (2000). The essential knowledge and skills of teacher leaders: a search for A conceptual framework. Paper presented at the annual meeting of the *American Research Association*, New Orleans, LA.
- Spillane, J. P., Halverson, R., & Diamond, J. B. (2001). Investigating school leadership practice: A distributed perspective. *Educational Researcher*, 30(3):23-28.
- Spillane, J. P., Halverson, R., & Diamond, J. B. (2004). Towards a theory of leadership practice: a distributed perspective. *Journal of Curriculum Studies*, 36:1. DOI: 10.1080/0022027032000106726
- Spillane, J.P (2005). Distributed leadership. *The Education Forum*, 69(2), 143-150. DOI:10.1080/0013.1720508984678
- Spillane, J. P. (2006). *Distributed Leadership*, San Francisco: Jossey-Bass
- Spillane, J. P. & Diamond, J. B. (2007). *Empirical Work on Distributed Leadership in Primary and Elementary School*.
- Taylor, M., Goeke, J., Klein, E., Onore, C, & Geist, K. (2011). Changing leadership: Teacher lead the way for schools that learn. *Teaching and Teacher Education*, 27, 920-929.
- Thomas, D. (2011). Becoming a teacher leader through action research. *Kappa Delta Pi Record*.
- T. Townsend, T. (Ed.) *International Handbook of School Effectiveness and Improvement*, 681-706. 2007, Springer. Chapter: *Teacher Leadership: Barriers and Supports*. Joseph Murphy.
- \*Wasley, P. A. (1991). *Teachers who lead: The rhetoric of reform and the realities of practice*. New York: Teachers College Press.

- Yager, R. E. (2000). A vision for what science education should be like for the first 25 years of a new millennium. *School Science and Mathematics*, 100, 327-341. doi: 10.1111/j.1949-8594.2000.tb17327.x
- Yager, R. E. (2004). Leadership in science education: Focusing on the unknown and moving to knowing. *Science Educator*, Spring 2004,13(1).
- Yin, R. K. (2009). *Case study research: Design and methods*. Los Angeles: Sage.
- York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*, 74(3), 255-316.
- Zinn, L. F. (1997). *Supports and Barriers to Teacher Leadership: Reports of Teacher Leaders*. American Educational Research Association.

APPENDICES

APPENDIX A

SURVEY

## Welcome to My Survey

**Thank you for participating in our survey. Your feedback is important.**

\* 1. Consent to participate in research

Project Title: Examining the pathways and triggers leading MSSE program graduates into leadership roles.

Researcher: Kate Solberg

Faculty Sponsor: Mary Leonard

Introduction: You are being asked to take part in research study being conducted by Kate Solberg for a doctoral dissertation under the supervision of Dr. Mary Leonard in the Department of Education at Montana State University Bozeman.

You are being asked to participate because you are a Master of Science in Science Education (MSSE) program graduate. Your participation in the survey will be anonymous.

Purpose: The purpose of this study is to explore the pathways and triggers that support MSSE program graduates as they move into leadership roles.

Procedures: If you agree to be in the study, you will be asked to complete a brief electronic survey (about 15-20 minutes of your time). If you complete the survey, you will be asked to provide your e-mail address so that you can be entered into a drawing for four \$100 Amazon gift cards. You will be asked at the end of the survey whether you are open to participating in a follow-up interview. If you are open to an interview, the researcher will contact you to arrange it. If you choose to participate in an interview, you will be entered into a second drawing for two \$100 Amazon gift cards.

Risks/Benefits: There are no foreseeable risks involved in participating in this research beyond those experienced in everyday life.

Confidentiality:

No identifying information such as your name, birth date, race or ethnicity will be gathered by the survey. However, if you are open to an interview, you will be asked for your name and contact information so that the interview can be arranged. In that case, your name will be connected to your survey responses to provide background information for the interview.

Confidentiality will be maintained to the degree permitted by the technology used. No absolute guarantees can be made regarding the confidentiality of electronic data, but every effort will be made to ensure the confidentiality of your responses. Survey results will be reported or published only as a synthesis of all responses; no individual survey results will be published.

Interview results may be reported or published as case studies, but every effort will be taken to protect the anonymity of persons interviewed.

**Voluntary Participation:**

Participation in this study is voluntary. If you do not want to be in this study, you do not have to participate. Even if you decide to participate, you are free to skip any question or withdraw from participation at any time without penalty. However, if you complete this anonymous online survey and submit it to the researcher, then the researcher will be unable to extract anonymous data from the results should the participant wish it to be withdrawn.

**Contacts and Questions:**

If you have questions about this research study, please feel free to contact Kate Solberg at [kate.solberg@gmail.com](mailto:kate.solberg@gmail.com) or 701-899-0468. If you have additional questions about the rights of human subjects, you may contact the chair of the Institutional Review Board, Dr. Mark Quinn at [mquinn@montana.edu](mailto:mquinn@montana.edu) or (406) 994-4707.

**Statement of Consent:**

In the electronic survey, you will be asked if you consent to participate in the survey. If you choose "yes," please complete the survey questions. If you choose "no," you will not proceed with the survey.

Yes

No

**2. What is your current role/position**

teacher: Pre-K-3rd grade

teacher:4-5th grade

teacher: 6-8th grade

teacher: 9-12th grade

teacher- college or other adults

lead teacher

principal

staff developer

curriculum specialist

clinician

informal science educator

not currently working

Other (please specify)

3. What is your gender?

4. How many years have you been teaching or involved in science education?

5. When did you graduate from the MSSE program?

6. What was your age when you graduated the MSSE program?

7. Do you fulfill any formal or informal leadership roles or take on leadership responsibilities within your school? If so, briefly list your roles in the comment box below.

Comments

8. If you answered yes to the previous question, when did you take on the leadership role or responsibility?

9. If you responded yes to question 7, that you do fulfill a leadership role or responsibility, how did you move into the leadership role or responsibility?

Other (please specify)



	1 (very little)	2	3	4	5 (to a great extent)	Does not apply to me
Teach and/or model changes in teacher practices that are necessary for improvement in student learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design, facilitate, and implement professional development aligned to state and national professional learning standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work with others to create an environment that encourages needed change using a research-based change model.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead others in prioritizing, mapping, and monitoring the implementation of the curriculum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Model and articulate exemplary instructional practices and strategies based on current research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promote and encourage teachers in developing higher order questions, thoughtful discourse, and critical thinking in the classroom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guide teachers in the in-depth understanding of lesson planning and delivery of content in clear and meaningful ways.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilitate teachers in the collection, analysis, use, and interpretation of varied assessment data for instructional decisions and changes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduct and engage others in appropriate research to improve educational outcomes and to help address critical education issues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Articulate and advocate to various audiences the rationale and processes of school improvement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilitate open dialogue of ideas and information that support student achievement goals and the change of teaching and learning practices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional comments you wish to share						



14. To what extent do you feel your participation in and completion of the MSSE program contributed to the development of the following leadership qualities?

	1 (not at all)	2	3	4	5 (to a great extent)
<b>Leading change:</b> Teacher uses effective strategies to facilitate positive change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Self awareness:</b> Teacher has an accurate picture of one's self in terms of strength, values, philosophy, and behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Continuous Improvement:</b> Teacher demonstrates commitment to reaching higher standards and readiness to take action to improve.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Instructional proficiency:</b> Teacher possesses and uses professional knowledge and skills in providing the most effective learning opportunities for students and adults.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments you wish to share:

15. To what extent did your participation and completion of the MSSE program support the development of the following factors?

	1 (not at all)	2	3	4	5 (to a great extent)
confidence in collecting and using data to drive instruction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
confidence in using a variety of instructional strategies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increased competency as a science educator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increased comfortability using technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increased science content knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments you wish to share:

16. Please provide your name and e-mail address in order to be entered into the drawing. Your name will not be linked to your survey responses.

17. If you are willing to participate further in this study, such as through an interview hosted online, via telephone, or e-mail, please provide your name and preferred method of contact below (e-mail or phone number).

APPENDIX B

INTERVIEW PROTOCOL: MSSE PROGRAM GRADUATES

## Appendix B

**Interview Protocol: MSSE program graduates**

1. Describe your role(s) as a teacher leader. In what ways do you consider yourself a teacher leader?
  - a. Describe how you have worked with other educators or with students to improve student learning.
  - b. Describe how you have provided professional development to other teachers (in your school, district, and elsewhere).
  - c. Describe how you have served as a mentor, coach, or content facilitator?
  - d. Have you accessed resources and expertise outside the school to support student achievement? Have you brought in outside resources or partnerships? If so, please describe their nature.
  - e. In what ways have you worked with colleagues to use assessment results to recommend potential changes in organizational practice to enhance student achievement?
  - f. Describe how you have provided support for other science teachers or teachers of a related discipline (STEM).
  
2. How did you come into this (each) leadership role? Was it (for each role) formally assigned or taken on informally?
  - a. If you were recruited or asked to fill a leadership role, how were you approached?
  - b. If you chose to fill the role, what did the process look like?
  - c. What were your reasons for taking on the role? What was your motivation?
  
3. What have been the outcomes?
  - a. Have you felt that your involvement has been a positive experience?
  - b. How does your leadership role complement your overall goals?
  
4. Describe how your leadership involvement has progressed over your career. Have you become more involved over the length of your career?
  - a. How has the MSSE program impacted that progression? What role did the program play?
  
5. What factors supported your development as a teacher leader?
  - a. Were there any specific factors or triggers that motivated you to take on (additional) leadership roles?
  
6. In what ways has your participation in and completion from the MSSE program impacted your ability to act as an effective science teacher leader?
  - a. Did the program provide any specific support in the development of your leadership skills?  
What opportunities did it provide you with?

- b. Did the program provide any triggers that encouraged you to further pursue/involve yourself in leadership roles?
- c. How did the MSSE program change your capacity as a leadership role?
- d. Was there a specific course or experience in MSSE that supported your development as a teacher leader?
- e. Did the capstone project support your development? If so, how?

7. In the spirit of continuous improvement, what more could the MSSE program do to further support your leadership development?

(Some questions were based on the Pathways to Leadership Questionnaire, Baecher, 2012)

APPENDIX C

INTERVIEW PROTOCOL: MSSE PROGRAM GRADUATES

## Appendix C

**Interview Protocol: MSSE program graduates**

1. Describe your role(s) as a teacher leader. In what ways do you consider yourself a teacher leader?
  - a. Describe how you have provided professional development to other teachers (in your school, district, and elsewhere).
  - b. Describe how you have served as a mentor, coach, or content facilitator?
  - c. Describe how you have provided support for other science teachers or teachers of a related discipline (STEM).
  
2. How did you come into this (each) leadership role? Was it (for each role) formally assigned or taken on informally?
  - a. If you were recruited or asked to fill a leadership role, how were you approached?
  - b. If you chose to fill the role, what did the process look like?
  - c. What were your reasons for taking on the role? What was your motivation?
  
3. What have been the outcomes?
  - a. Have you felt that your involvement has been a positive experience?
  - b. How does your leadership role complement your overall goals as an educator?
  
4. Describe how your leadership involvement has progressed over your career.
  - a. Have you become more involved over the length of your career?
  
5. What factors have supported your development as a teacher leader?
  - a. Were there any specific factors or triggers that motivated you to take on (additional) leadership roles?
  
6. In what ways has your participation in and completion from the MSSE program impacted your ability to act as an effective science teacher leader?
  - a. Did the program provide any specific support in the development of your leadership skills?  
What opportunities did it provide you with?
  - b. Did the program provide any triggers that encouraged you to further pursue/involve yourself in leadership roles?
  - c. How did the MSSE program change your capacity as a leadership role?
  - d. Was there a specific course or experience in MSSE that supported your development as a teacher leader?
  - e. Did the capstone project support your development? If so, how?

7. In the spirit of continuous improvement, what more could the MSSE program do to further support your leadership development?

(Some questions were based on the Pathways to Leadership Questionnaire, Baecher, 2012)

APPENDIX D

INTERVIEW OF PROTOCOL: PRINCIPAL

## Appendix D

**Interview Protocol: Principal or Supervisor of case study participants**

1. Can you describe this \_\_\_\_\_ (specific individual) as a teacher?
  - a. What leadership qualities does this teacher portray \_\_\_\_\_ (specific individual)?
2. Were you the the administrator/principal/supervisor of the individual prior to their engagement in the MSSE program (provide year for them).
  - a. If so, can you attest to any changes or growth in their display of leadership behaviors or skills?
3. What roles within the school or district have they taken on? How did they transition or move into this role (ask for each role): were they asked/recruited, assigned, or did they chose to fill the role themselves?
  - a. Why was this the person the right fit for this role?
4. Teacher leaders are described as having an impact outside of their classrooms. How does this statement fit \_\_\_\_\_?
  - a. In what ways does this individual make an impact in this program, role?
5. Has \_\_\_\_ worked with others in the school, district, on a wider scale to improve student learning? If so, how and to what extent?
6. Has \_\_\_ provided any professional development to other educators? If so, what were the topics and who was the audience?
7. \_\_\_\_\_ serves as a member/chair of \_\_\_\_\_ (specific team or committee). What is their role? What responsibilities does this entail?
8. What else can you share about how \_\_\_\_\_ portrays his or herself as a teacher leader?

APPENDIX E

THEMES AND CODES FOR CASE STUDY

**Appendix E***Themes and Codes Used to Analyze Case Study Interviews*

Themes	Codes	Definitions	Research Question
Teacher Context	TC1.Educational/professional background TC2.Traits or skills identified by teacher TC3. Traits or skills identified by administrator TC 4. Thoughts about leadership TC5. Personal information shared	TC1. Teacher's undergraduate education or previous career. TC2. Skills teacher self reports TC3. Skills teacher displays, reported by principal TC4. Teacher's thoughts about leadership TC5. Any information about the teacher that impacts school, teaching, or leadership situation	
School Context	SC1.Geographical location SC2. Size of school SC3. Grades SC4.Curriculum used SC5. Student body SC6. Leadership opportunities SC7.Lack of science emphasis	SC1. Where the school is located SC2. How many students are served SC3. Grades that are taught in school SC4. Special curriculum used by school SC5. Student body demographics, socio-economic status	

		<p>SC6. Leadership opportunities based on school context</p> <p>SC7. Lack of emphasis on science content due to context of school</p>	
Teaching Assignment	<p>TA1. Current</p> <p>TA2. Former</p> <p>TA3. Grade level</p> <p>TA4. Years (position)</p> <p>TA5. Years (administrator)</p>	<p>TA1. Content/classes teacher currently teaches</p> <p>TA2. Content/classes teacher taught in past</p> <p>TA3. The grades of students the teacher serves</p> <p>TA4. How long the teacher has served in current position?</p> <p>TA5. How long the teacher has worked with the current principal</p>	
Leadership Role	<p>LR1. Current</p> <p>LR2. Former</p> <p>LR3. Title</p> <p>LR4. Actual tasks</p>	<p>LR1. The leadership roles the teacher currently fills.</p> <p>LR2. The leadership roles the teacher has filled in the past.</p> <p>LR3. The name given to the leadership role.</p> <p>LR4. The responsibilities</p>	1, 2, 3

and duties involved in the leadership role.

Pathway to Role	<p>PW1. Formal          PW1a. Applied          PW1b. Appointed/nominated/Invited (formal recruitment)          PW2. Informal          PW2a. Recruited          PW2b. word of mouth          PW2c. Volunteered          PW2d. Advocated          PW3. Transitional          PW4. Monetary aspect          PW4a. stipend          PW4b. voluntary</p>	<p>PW1. Teacher moves into role through a formal channel.          PW1a. teacher formally applies          PW1b. teacher is appointed, nominated, or invited to participate in formal manner          PW2. Teacher moves into role through an informal channel.          PW2a. Teacher is informally recruited.          PW2b. Teacher ends up serving in role due to word of mouth and others seeking out their expertise.          PW2c. Teacher volunteers to fill role.          PW2d. Teacher advocates for a role that doesn't</p>	1, 2, 3
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exist.

PW3. Teacher starts in a role that either turns from informal to formal, or turns into another role.

PW4. Indicates whether teacher is compensated for the work done in the leadership role.

PW4a. Teacher receives stipend or supplemental income for serving in role.

PW4b. Teacher does not receive a stipend or supplemental income for serving in role.

Pathways Stem From	PWS1. Previous involvement PWS2. Conversation PWS2a. Sharing information PWS2b. Seeking feedback	PWS1. Teacher's movement into role stemmed from previous involvement in leadership roles PWS2. Teacher's movement into role stemmed from a conversation with an individual PWS2a. Movement stemmed from a conversation in	2
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which information was shared.  
 PWS2b.  
 Movement stemmed from a conversation in which the teacher sought feedback.

Outcomes of Role  
 Personal:

- PO1. Positive feedback
- PO2. Respect/trust of administrator
- PO3. Career advancement
- PO4. Teacher engagement
- PO5. Understand school procedures

- PO1. Teacher received positive feedback about tasks completed
- PO2. Teacher earned respect and trust of the principal through involvement in role.
- PO3. Role contributed to a perceived career advancement.
- PO4. Teacher feels engaged and had continued interest in education through involvement in role.
- PO5. Teacher understand procedures used in school or district.

Outcomes of Role  
 Within School

- SO1. Increase in use of skills/techniques
- SO2. More collaboration between teachers

- SO1. Increased of instructional skills & techniques used

in school, may be indicated by student engagement.  
SO2. Increased collaboration between staff

Motivation to take on leadership roles	<p>M1. Enjoy specific task/subject M2. Involvement/make impact/make decisions/drive change M3. Experience and qualifications M4. Positive feedback M5. Best for students</p>	<p>M1. Teacher enjoys the tasks involved in the role. M2. Teacher wants to be involved in decision making and make an impact M3. Teacher is qualified to fill the leadership role M4. Teacher has received positive feedback about leadership tasks M5. Teacher wants what is best for students and student instruction</p>	1.
Leadership Progression Over career	<p>PC1. Gain experience PC2. Learn skills PC3. Increased involvement PC4. Increased opportunity PC5. More willing to share</p>	<p>PC1. Teacher has gained experience PC2. Teacher has learned new skills, instructional or other. PC3. Teacher has become more involved in</p>	2

		<p>leadership.            PC4. Teacher is offered more opportunities            PC5. Teacher is more willing to share with other staff.</p>	
Leadership role and link to professional goals	<p>PG1. Remain in classroom            PG2. Move out of classroom</p>	<p>PG1. Role supports teacher in serving in classroom instruction.            PG2. Role supports teacher's goal to move out of classroom instruction.</p>	
Leadership Progression MSSE Contributed to	<p>LPM1. Increased confidence            LPM2. More content knowledge            LPM2a. Exposure to field courses            LPM3. Opportunity to learn from other science teachers</p>	<p>LPM1. MSSE contributed to leadership progression by contributing to an increase in confidence.            LPM2. MSSE contributed to leadership progression by contributing to an increase in content knowledge            LPM2a. MSSE contributed to leadership progression by contributing to content knowledge through field</p>	3

		courses LPM3. MSSE contributed to leadership progression by providing a means to discuss science education with other educators	
Knowledge/Skills Gained from MSSE	KSG1. Instructional KSG2. Collect/analyze Data KSG3. Science content KSG4. Collaboration	KSG1. Teacher gained instructional skills through the MSSE program. KSG2. Teacher learned how to collect and analyze data through the MSSE program. KSG3. Teacher improved their science content knowledge through the MSSE program. KSG4. Teacher learned how to better work with and collaborate with other teachers through the MSSE program.	3.
MSSE & Support Leadership Development	LDM1. Reflective LDM2. Measure & evaluate learning LDM3. Instructional techniques LDM4. Increased content knowledge	LDM1. The MSSE program supported leadership development by helping teachers reflect on their	3.

LDM5. Increased confidence own practices.  
 LDM2. The MSSE program supported leadership development by supporting teachers as they learned to measure and evaluate learning.  
 LDM3. The MSSE program supported leadership development through an increased knowledge of instructional techniques.  
 LDM4. The MSSE program supported leadership development through an increase in content knowledge.  
 LDM5. The MSSE program supported leadership development by contributing to teacher's confidence.

Specific courses/experiences contributed to leadership

SCC1. Increased confidence

SCC1. Capstone contributed to leadership development

3

<p>development: Capstone</p>	<p>SCC2. Use data to evaluate learning SCC3. Reflective SCC4. Understand research as consumer</p>	<p>through increasing teacher confidence. SCC2. Capstone contributed to leadership development through teaching teachers how to use data to drive instruction. SCC3. Capstone contributed to leadership development through providing teachers tools to reflect on their practices. SCC4. Capstone contributed to leadership development through teaching teachers how to read and better understand educational research.</p>	
<p>Specific courses/experiences contributed to leadership development: Field Courses</p>	<p>SCF1. Field data collection SCF2. Science content knowledge</p>	<p>SCF1. Field courses contributed to leadership development by providing opportunities to collect data. SCF2. Field coursed contributed to leadership</p>	<p>3</p>

<p>Specific courses/experiences contributed to leadership development: Education classes</p>	<p>SCE1. Education content knowledge SCE2. Assessment and evaluation skills</p>	<p>development by helping teachers develop their science content knowledge.</p> <p>SCE1. Education courses contributed to leadership development by supplementing teacher’s educational content knowledge SCE2. Education courses contributed to leadership development by helping teachers understand how to assess and evaluate student learning.</p> <p style="text-align: right;">3</p>
<p>Suggestions for MSSE program</p>	<p>SM1. Offer classes with leadership focus SM2. Offer opportunities to share with other teachers SM3. Link program to leadership activities within home school SM4. Provide way to for graduates to stay connected</p>	<p>SM1. Offer courses specifically focusing on leadership. SM2. Offer or provide opportunities to share instructional or content information with other teachers. SM3. Provide teachers with opportunity to share course</p>

Comments about the program in general	CP1. General comments	work with their colleagues at their school. SM4. Provide a means for program graduates to communicate after program ends. CP1. General comments about the program, not suggestions.
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APPENDIX F

MS. HOFFER TRANSCRIPT

**APPENDIX F**

Interview with Ms. Hoffer

I: Ok, so..um, the first thing I guess I would like to ask about is just to get a context of your teaching situation..can you tell me

H: Sure

I: a little bit about your school size, um, the grade levels you teach

H: Sure. Yeah, I work at Hill Crest High School in Ammon, Idaho, which is a suburb of Idaho Falls, um..Ammon, or Hill Crest has about a little under 2000 students. I think we're between 1700 and 1800 students, um, I teach AP Biology, um ...Dual credit Anatomy and Physiology, and then, um, I also teach, like if they didn't want to take AP bio, then they could also take the dual credit Bio 101 classes for Idaho State University.

I: Mhm, and that is an online course, or it that in class?

H: Um, these ones are just in class. So that's what I teach at my, um...face to face school. I have two online schools, but those are my face to face ones.

I: OK, and then, tell me a little bit about the online school that you...that you work with.

H: Sure. So I work for two actually. Um, the first one is Bonneville online high school, and that's the ..the virtual school that's associated with the school district that Hill Crest is...um...is, you know, in the district with. And, um, for that one, I teach, um..Astronomy,

I: mhm

H: and Environmental Science, and Biology, general Biology A and B, so that's a sophomore level class, both first and second semester.

I: OK

H: And I also teach for, um, Idaho Educational Learning Academy. I: Mhm

H: And, um, that's the ...that's the Idaho state online school, or one of them, um and for IELA, is what we call it, so for IELA, I teach um..dual credit anatomy and physiology with Northwest Nazarene University, which is out of Boise, Idaho.

I: Ok. That sounds like a full...full course load! How do you manage it all? (laughs)

H: Yeah, there is a lot (laughs) happening! You know, I actually, um, I kind of picked them up at different times..you know I started with just my face to face school at Hill Crest, and then...um, you know, then I slow...I worked on the..the Bonneville online program. We got that ..that running, and I was the first Bio teacher for that school, and then I started my masters' with MSSE and then, um..once I did that, I decided..well nothing else keep me more busy than those three things, so when I graduated, I applied to do the ...the other online school just to ..to have something else..another income, and something else to do at night.

I: mhm

H: And I'm able to...you know..finish those on ..at night and weekends and that sort of thing. I: mhm. Ok. How teachers are falling into like ..the science department in your building?

H: Um, so how many teachers are there? Is that what you're asking? I: In the ..in the science department, yeah.

H: Um..let's see, I have to count this, sorry. So..there's....I'm one of six.

I: Ok. So with your, I think um...and you can answer questions for all of your different teaching roles, um..

H: Ok

I: Do you want to just describe what kinds of things you do, whether it's in your school building or with your online positions, that ..that fill a role of leadership?

H: Um, so I...in my face to face class, or school, um..I am the... I'm on the professional learning committee, so this PLC, I'm on the leadership committee, um which is a supplemental

???something??...so the leadership committee's made up of ten teachers out of ...I don't know, I

think there's 65 teachers or something in our building. I: mhm

H: but we...we basically help make decisions with the principal and with the administrators, um to, you know, drive student change. So that 's probably the biggest one that comes to mind. We also have focus team leaders, and I'm a focus team leader. I'm in... I'm responsible for the faculty news letter, um...so basically, that's just a matter of personal development. So we develop, you know, we come up with a..a monthly newsletter, it's typically professional development related, um..you know things we don't have time to talk about in faculty meetings.. I: mhm

H: and so I put that together and those are the ...I would say the two leadership roles...um, that I... that I get paid for. Um...a couple of the other ones, are um, kind of less concrete if you will

I: mhm

H: they um, a lot of...we have..we're a student teaching school, so a lot of the student teachers from um..South East Idaho end up being at Hill Crest, um...and so a lot of those student teachers come to my classroom for um...just a lot of observations in management

and um..the organization aspect, so they were...they were recommended to come and talk with me um...in their student teaching..um..courses.

I: mhm

H: And then... um, as far as some of the other online ones, um..I wouldn't necessarily say they're leadership roles, but I've um..volunteered to do a lot of different um..professional development presentations on the different teaching models that I've implemented over the..the course of ..um, my career.

I: mhm.

H: And that's about it.

I: Which sounds like a lot, with all of..all of the rest of the responsibilities that you have (both laugh)

H; Yeah, well, I stay pretty busy, that's for sure!

I: Yeah, absolutely! How..how did you come into ...I know the first couple you said were more..a little bit more formal or a little more, like, official roles of leadership. Do you want to just talk to each of those, including...um, you know, the less concrete roles that you have and how you kind of moved into them?

H: Sure. So, you know, the ..it seems. I mean, the first one, the ..um..PLC role, actually, um, was sort of by default. I wasn't the intended recipient of that job. Um, but it ended up happening that um, I was the newest member of the science department at the time, so that would have been...you know, five years ago, cuz I would have only have been at Hill Crest for a year.

I:Hmh

H: And they were just starting to roll out professional learning communities at our school, and um...they were offering all the trainings and stuff for it, and they had called all of the other science teachers, who were not interested in that position, and so it sort of landed on me.

I: (laughs)

H: I mean, that...isn't that the dumbest thing ever (laughs)...but, you know, they had a lot of opportunity to..... to get rid of me from that position

I:mhm

H: but they continued to ask me back, um they wouldn't have had to put me on the ..you know originally they weren't stipend positions..um, originally it was just a part of something else you were going to do that year. And so that initial training, I went to, but then a couple of years after that, they started um...I don't want to say applying, but basically, you had to be appointed or you had to be asked by an administrator

I: mhm

H: Um...to fulfill the leadership professional ..um..PLC role, and so they could just continue to ask me back, um..I think a part of it was probably because I was the first one that was...I'm one of the only ones that are...that are left at the school that was at that initial training,

I: mhm

H: and, I think another part of it is, you know, I know it pretty well now, and I don't think I did that bad of a job (both laugh), so that was ...that was kind of how I fell into that role. Um, then the newsletter role..um, the focus teams, we....I had been advocating we... we

implement a ...a school newsletter, because I felt like the professional development in our school was really lacking,

I: mhm

H: I didn't think that teachers....um, unless they were involved in a masters program or a book study or something you know, for ...you know, those extra credits...whatever they're called, um, I didn't feel like there was any professional development happening,

I: mhm

H: and I felt like there was a lot that was changing, um a lot of technology was changing, there's a lot of new stuff that was out, and ...our teachers aren't...we have iPad and we have all of these other technology things and nobody seems to know really how to use them. And so I advocated for about a year to get a..a newsletter that we would be ...um..our sole responsibility would be to dispense information

I: mhm

H: that as people needed it, maybe they could take something from it. And we um, so that's been going for about two years at this point.

I: ok

H: So...

I: And when you say that you ..that you advocated, um..do you want to just describe what that process looked like? Were you telling other teachers, or who were you visiting with?

H: Yeah! (both laugh) You know, I did talk to other teachers about it, and you know, they were all my teacher friends, so you know how teacher friends are---they say, oh yeah, that's a great idea! Ya know? (both laugh)

I: Yeah!

H: But..I ended up going um..I made a couple samples. I made about four months of samples just on my own time, um, to show the principal what it would look like.

I: mhm

H: Cuz I don't think that ..um, he kind of ..you know, had said, yeah that's an ok idea, and I said 'Well, let's do this tomorrow' you know? (both laugh) 'Lets get this done.' And so, I ended up coming up with a...a... several months worth of samples and it was a combination of ..you know...the teacher sarcasm that every body loves to read, and I figured if they could be drawn in by the teacher sarcasm, you know, the "said no teacher ever" kind of lines,

I: mhm

H: and some of those kind of things, and if we had a..if we had an ability to blend that with some really great professional development, that wasn't, you know, it wasn't a course, it was just a paragraph of - hey, try this in your classroom. And I thought that that would be ..that would be a really positive thing, and so..um, I started putting them actually (laughs)...we call them the "potty posts". (both laugh). I started e-mailing them to every body...um..you know, we have the staff e-mail, so I started e-mailing them to everybody, and then, another teacher had suggested that maybe we put them in the faculty bathroom.

I: mhm

H: Um..and so we started posting them in the faculty bathrooms, and um...and the next..over that summer, they decided ...they rearrange the focus teams every year, and

over the summer they put...um, they decided the newsletter was going to be an official focus team committee for the school.

I: awesome. awesome. And then, you mentioned the ...um, having students teachers come in or people that are in their educational program come in...

H: Sure

I: How did you end up in that role?

H: You know, that role was not administrator um...driven at all. That was more ..um teachers...so, the teachers of the student teachers are required to go out with their student teacher and observe..um classrooms. And, um..you know, word of mouth spreads really fast with high school students, as you probably know..

I: mhm

H: And, um..they'd you know..."Which classes are really hard? Which classes are really good? Which teachers do you..whatever?" You know, those kinds of things, and teachers just started trickling in. And so, it ended up kind of growing to the point where I had to start making a schedule, because I couldn't have 10 ...10 additional people in my room each ...each day, or you know, and then we started to try to ...to bring them in when we were doing...you know, if you're a science person, then we'd try to bring them in when we're doing a lab, or when we were doing some odd transitions, because, I mean...you're a teacher right, so...

I: mhm!

H: You know there are some days that are just ...they're just not good days... I:mhm

H: but you kind of need to observe those days because there's a lot happening and it's

kind of messy, and it's ok, but I don't think new teachers always know how to manage that messiness. Some of that housekeeping stuff...so we would...we would come on the really good streamlined days where there was a really good plan, and then we'd have them come in on a day where you had a sub the day before and the whole class is kind of a mess because

I: (laughs)

H: you don't really know what they did the day before. I; right

H: So, we kind of made schedules that way. And so, that..I don't know if that's really a leadership position, I don't know if it counts.

I: oh, absolutely

H: but, um, but that's kind of how that role formed as well.

I: So when you're looking at the different roles that you fill, um...what..what do you think your motivation has been behind um, agreeing to being part of something, or ..or choosing to do it yourself...what..what is your motivation then, behind it?

H: (Laughs) You know, there is a saying at our school, and that I absolutely despise. And they talk about, um...basically they tell a little story. And it's a ..a thing in our school, and I don't know if it's everywhere, but..they basically say if you draw a dot on a piece of paper, you just have to worry about your dot. And your dot is your classroom, and that's all you can do. And I think that, um, the ..the reason teachers came up with that was because they talk about, um, you know, there's new standards, and there's new tests, and there's the high stakes testing, and there's um..common formative assessments, and now there's ECA's, and there's all of these things that are out of our control

I: mhm

H: So if we just focus on our dot, we're gonna be ok. And I don't like that saying because ...for some reason that saying rubs me the wrong way. I: mhm

H: I feel like we need to draw a bigger circle. And we need to drive change, and the only we can do it is by doing it really loud.

I: mhm

H: And the more I talk, the more things are gonna happen, and if we go and get it and just get it done, and if I just continue to talk..then eventually, someone's gonna ...someone's gonna rub off on that and we're gonna start doing that together. And eventual..I think that ..I don't know...I don't know if that's a very good answer, but I just really don't like that saying, that we can only control so much.

I:mhm

H: Because, I feel like...we can change more, we just have to be a...we have to have mechanisms for a vehicle of change. And I think that it's doable, it's just..hard.

I: mhm. Absolutely. What do you think have been...and this kind of goes right along with your motivation to drive change in your school.....What do you think the outcomes have been? Do you feel like, um, your involvement has..has brought about some different outcomes?

H: You know, I think so. I mean, I hope so. Um, you know, and I do a lot of the professional development on different teaching styles and strategies, and..um, just the different ways to teach rather than, you know, the old school lecture kind of format.

I: mhm

H: And I think that it's been beneficial. I mean, I like to think it's beneficial, I don't know if it...the thing is..I don't know what goes on in other classrooms, so I don't really know if it changes...

I: mhm

H: but I feel better about it...(both laugh)

I: When you say that you do the professional development, is that ..um..aside from the newsletter, is that in like a presentation format?

H: Yeah. I usually do about 2 presentation a year. Um, I did the ..the beginning of the year professional development ..how you know, there's like a week before school that you..you have to prepare, and one of those days gets kind of swallowed up by the principal's professional development day? And I ..I typically do.. an hour or two presentation on what ever the principal asks me to do...

I:mhm

H: Um...and then for the...for IELA and for the ...I guess just for IELA, we have a summer conference, and I typically ..for those ones I do volunteer. I basically...they send an e-mail out and they say- hey, what are you doing, what would you be willing to share? and I always fill it out. You know, and I make up a name of what ever the class I'm...not really a class...but, whatever little break out session I'd be willing to present on is...I don't know why I do it, it makes more work for myself, but I feel like...I feel like it's one of our professional obligations (laughs).. I: mhm

H: I guess

I: mhm. And with the ...in house, in high school ..uh, professional development, you're

usually recruited by your principal? He just kind of casually asks you?

H: Yeah, that's usually what happens. Um, I used to be on the professional development focus team, I was not a leader on the team, I was just a member of the team..and, um..So originally, I guess it kind of started because the..the professional development committee would be asked by the principal to have some presentations, and I would either be volunteered or I would volunteer...so, I mean, there was I guess a back story to that, but..

I: mhm. So you have found all sorts of different ways in to being in a leadership role, it sounds like.

H: Yeah! You know, I think if you're really loud and you never ...you know, the squeaky wheel gets the grease sometimes..(both laugh)..so

I: And do you feel like your involvement for yourself has been overall, a positive experience? H: I do. I think it's been really good for me, I think it's been..um, I think it keeps me in it, I've found that I get really bored very quickly

I: mhm

H: um, I'm a pretty type A personality so if I'm not working with something, I feel like I'm not doing anything, um..So, I think for me it's been really good, I think it's helped keep me interested in education

I:mhm

H: which probably sounds bad, but...to, you know...it keeps me interested in what I'm doing cuz it's changing, and I don't mind keeping up with the change. I really like ...I really enjoy learning about different teaching styles and different pedagogy, I like that, that's kind of my thing.

I: mhm, mhm

H: So, um...it doesn't.. it seems like the fun and exciting new kind of hobby...it's almost like a hobby.

I: mhm

H: Is really what it is (laughs)

I: How do you think your leadership roles that you take on complement your overall goals as an educator?

H: You know, I think that from the very beginning, when I started teaching...which wasn't very long ago...um, I kind of always wanted to somehow reach a larger group of people.

I: mhm

H: And, you know, it started off with just the department...actually, it started off with my classroom- how many kids could I get to pursue health related...because I anat and phys. mostly... um, and bio, so how many kids are gonna major in biology? or premed? How many kids can we change their mind, because they come in and they hate science cuz of that so and so or that Krebs cycle which is so hard

I: (laughs)

H: You know, so I felt like maybe if..at first it was how many kids can we get to go into the health occupations ...how many could we get to be engineers and that kind of thing ...and then..that was probably year 1 and 2..and then after that it was like...How many teachers ..if I

..if I..if we...If I can only control ..not even control, but if I have an influence 150 kids per

year, how many would our department, our science department have or our school have..and then I started seeing things or, you know, looking at things from maybe a bigger picture.

I: mhm

H: and I felt like ...the only way we can drive change is if we ..really or you know, try to..try to reach above and try teach people different methods and that sort of thing.

Ultimately, I think I'd like to move on to the college level and maybe teach preservice teachers.

I: mhm

H: Um, because I don't think that we model to them very well what the expectation is going to be. I think that those ..those college professors..a lot of them..not in the MSSE program, but it seems like a lot of them, um, I don't know, I feel like it's a lecture style but then they..they lecture to you by telling you in their lecture, they say 'Don't lecture, it's not very effective'

I:(laughs)

H: it's not a best practice, but here's the next slide. I: mhm, very true

H: And that's frustrating and I feel like ...I feel like maybe if we could get them...if we could get these preservice teachers ..that if we could model better practices for them, then I think we'd have ..we'd have...our biggest student number would be bigger if we started with them (laughs) I: mhm.

H: So, I think, overall, my goals are pretty driven towards maybe doing that some day

I: mhm. How do you think, and you mentioned that, you know, you haven't been teaching

that long, um..and I looked at your resume and it looks like you started teaching in a classroom in about 2009?

H: Yes

I: So you've been in the classroom for 6 years?

H: Yeah

I: How do you think your leadership involvement has progressed over your career? Have you found yourself being more and more involved?

H: I have. I have found myself having..I'm more involved because it seems like once you do one thing, that's sort of your thing and then you just keep adding to it.

I: mhm

H: I think also, um in schools, you have the will do's and the won't do's...just like kids, you know.

I: mhm

H: And once your principal and your administrators know that you're a will do kind of person they...they definitely ask for you first.

I: mhm

H: Because they know you'll do it. And I think, by..by default a little bit that way, um, that makes it so..you do more (both laugh). Which isn't a bad thing. I don't mind.

I: Yeah. How do think your...um...involvement in the MSSE program impacted the progression of you leadership skills over the course of the last 6 years of your teaching career?

H: Sure. I feel like you want me to say that..it has helped. But I don't think that is has

(laughs a little). I think it's that it's not helped, I think that it's a pretty neutral um...factor.

I: mhm

H: I think the only..it hasn't um, helped in terms of my personality , I think that I was always kind of set forth in what I was going to do, and..the..I guess the only thing that I would say that maybe it has impacted is that it was a mechanism to provide that masters' degree.

I: mhm

H: behind what my philosophy is. I: mhm

H: But, as far as what I given roles or leadership positions or anything like that, I would actually...I haven't been... there's none. I haven't received any. But I had all of those positions before entering my masters' program, actually.

I:mhm, and I...I saw that in your ..um, application materials to the program..that you came into the program with a very strong leadership component already there...um, do you think that the

..the, um experiences provided in the program gave you any way to be a leadership...um, or a teacher leader in a different capacity, or it helped build some skills?

H: Um, ..um, I don't know. I mean...I don't ..I don't feel like they had. I don't feel like they did, um..I feel like ..it was mostly just that degree..which kind of makes me sad, a little bit, but that's kind of how I feel.

I:mhm. Outside of the program, were there any specific factors or triggers that ...that really motivated you to get into a leadership role?

H: um..I would say probably just ..I wanted to be able to impact more students.

I: mhm

H: and I felt like..the only way to impact more students was to be involved in school leadership and then district leadership, and then maybe state leadership at some point, but you know, I mean you can see those ...you know, the big picture kind of things, and I feel like to impact 150 kids is great, per year, that's awesome.

I:mhm

H: But if you could impact almost 2,000 kids at a school level, or you know, if you know....if you can just draw that bigger picture, I would say that..that is the..the big picture I think in those leadership positions. I don't think it's necessarily to say ..oh I'm just on this leadership position, you know, I don't think that being a leader the biggest part of that, I think it's that you're a leader to impact student learning.

I: Exactly, yep. Um...one of the components of the MSSE program was the capstone project. H: sure

I: How did you feel about..about the project H: (laughs)

I: and did it help you develop any skills of um..that you use?

H: You know, I loved my capstone project. Um..I thought that that was the coolest thing I've probably ever done, in my classroom. Um..I've..you know I probably would've done what I did for my capstone anyway,

I: mhm

H: but, I think..um, the capstone provided that data aspect that I wouldn't have been keeping track of otherwise,

I: mhm

H: you know, I mean, I would've eventually ..um, pulled together a lot that research...I'd been looking up and, you know, those different teaching styles and models...I would've pulled those all together, but I think that the component that I was missing was the data.

I: mhm

H: and, once I..that capstone provided that data aspect and required it of me, in fact and that requirement made it all the greater, too, because it gave me..and, I think administrators, it gave me the ability..because, you know, I always ...was bothered by the saying 'research shows'...Well, what research.

I: (laughs)

H: Whose research? So you read some book somewhere (laughs), that means it's right? What research and what have you done and does it work here and all those kinds of things and I think that that provided a really good, um..way for me to say, well, my research, right now.

I: mhm

H: my research show this, and that was ...I think that was really impactful for me. I don't think that that probably was impactful for anybody else...

I: mhm

H: or, when I give those presentations, I don't think it helps them..um, but it was..it's impactful for me and so , that's important.

I: mhm

H: Um, as far as the capstone ..like the capstone week when you go and view other peoples' capstones, I would say that I was underwhelmed a lot of..by some of the

capstones that I saw. I: mhm

H: I was disappointed in the...the..I don't know..the time commitment maybe, or the lack of data that I saw, it was a lack of..you know, I ran mine ...I ran my experiment for 27 weeks over..I mean, 3 different quarters, and I just felt like that was a really good data set,

I: mhm

H: You know, I was drowning in data...but I felt like the ones that went for 4 weeks and they

..you know, I just didn't, I didn't see the ...the...I don't know, I don't know how to phrase it, I don't know what the right terms..term is, but I didn't see the longevity in it.

I: mhm

H: I didn't see the value, because I felt like, you can do anything for ..four weeks I:mhm

H: I just felt like...you would..you'd have a better, solid foundation if you..you know, extended it for a semester or something

I: mhm

H: that's probably not what you were asking (laughs), but ...

I: You mention that in your ..um...all of your application materials and in your essay that you wrote for the program, it shows that...and you've alluded to this...that you're very much someone who does want to be heard and to make an impact. Um...and so it sounds like as far as a leadership component, the MSSE program maybe wasn't a huge contributor because you already had that?

H: It could've..I mean, it could've been. You know, and I don't know if ..it it..I don't think

that the MSSE program, um, bred leaders. I don't think that was the point of..I didn't feel...it might be

one of their goals, it might be a goal of the ..the program, but I ...that goal was not um...was not any where on the radar for me. I felt like their goals were to develop, um..or to, you know, to teach teachers better best practice methods

I: mhm

H: teach teachers..um, you know, what the difference between..um, you know..formative and summative assessments and give us tools. I felt like they were giving us tools,

I: mhm

H: Um, additionally, I felt like they um..were helping provide a stronger science foundation. I don't think that..I didn't get at least get that they wanted us to be leaders.

That probably would be a long term goal for them, but they.. I mean, there was no class

I: mhm

H: that provided that ..or..and it's ..I think it's very difficult to teach somebody how to be a leader I: mhm, it is

H: um, and I don't...I think you, I remember now that I'm starting thinking about it..I remember during capstone week, I remember after my presentation, they said, you know, we'd like

..we...you know all our hope is that you share this with people I:mhm

H: but..to me, I mean, that would be a goal, but I don't know how you would make that really concrete goal if you were a part of the program

I: mhm

H: so, those goals weren't expressed to me at all

I: and um..as far as what the MSSE program puts out um..they don't have an inherit leadership goal, um..I'm just looking at the program um..from my perspective and some of the big things that help support teacher leaders are some of the things that the program does do

H: Oh, sure

I: so, they don't have a really strong ..um, leadership goal written in their um..you know, in their material on their website...

I: as far as..if that was more of a long term goal for the program, what do that the MSSE program could do to further support the leadership development of their science teachers that are in the program?

H: Um, you know, I think, at least my experience is ...I had ..um, John Graves, and you know, Peggy Taylor. You know, I thought that they were really helpful, um, they really persuaded me and tried to push me to try to publish...

I:mhm

H: my research, and I think if they um, I think that if they wanted to incorporate a stronger leadership role or giving more skills, I think that they would ..um..maybe, I don't know how to push it more..to publishing, but I think that there's something that comes out of that..I think maybe, in the capstone process, or in one of those courses that you have to take, you know, maybe if they had...teachers sharing with other teachers. Maybe you had to document a faculty meeting that you did professional development or you know, if they did something like that..if they made a component like that, I think it would foster

teacher leadership a little bit better.

I: mhm

I: Is there anything about your role a teacher leader or your development or anything else that you'd like to share with me?

H: Um, I don't think so..I feel like I probably told you more than you really wanted to hear (laughs)

I: (Laughing) No

H: No, I don't think so. I actually, um..I don't know if this would help, or not, or maybe hinder your research at all, but I did actually resign my position this year. Um, so this is my last year that I'll be teaching at um..my face to face school..um, which is kind of different, you know, I love it, but I did resign, and I'm interviewing at this point with Idaho State University in their um..college of education department..so I don't know if anything will work out there, but you...if...if it does work out, then ..then you that the masters'..just having that masters component helps to where you're going, regardless of what direction that is.

I: right..

I: awesome, well, good luck to you! That's a wonderful opportunity.

APPENDIX G

MR. SEMMLER TRANSCRIPT

**APPENDIX G**

Mr. Semmler

I: Ok, so...um...I'm looking at your resume that you e-mailed me, and I'm seeing that you changed into a different position, or a ...a different school shortly after...was it shortly after finishing the MSSE program.

S: Yeah, it was right away. Yeah

I: Ok. And, you want to tell me a little bit about um..like, the size of the school, and just give me a few descriptors there?

S: Uh, it's a private school that is from uh..pre-k all the way through grade 12, uh, and it's about 900 students, give or take, 20 every year...

I: mhm

S: And, we follow the ..uh U.K. national curriculum, I: mhm

S: and it's uh..predominantly staffed by .... uh..British students, but..er British staff, um there are...headmaster's Canadian and there's two other Canadians on staff and probably about four or five Americans. And the rest are either British or Bermudian.

I: mhm. S:Yeah.

I: And then, your role at that school..it looks like ..it looks like you have a teaching role as well as your head of data management?

S: That's correct, yeah.

I: Ok, um...and was there a reason following the program where..when you graduated from MSSE you were ready to transition into a different school, or did just happen by

coincidence? S: It just...it just happened more or less by coincidence, it wasn't as a result of doing the MSSE program, it was just that I was uh, ready for uh...that sort of...at that point of my life in my career, I was ready to..uh, try something different.

I: mhm.

S: Yeah, so it was uh...before um coming out do to my capstone I was already in the process of making the transition to this school.

I: Ok. Ok, and the um...leadership roles that you listed were things like head of data management, and..head of exams.

S: Yep.

I: Do you want to tell me a little bit about what that role entails?

S: Uh, when I was head of exams, I was basically responsible for coordinating all of the external examinations that happened at the school, and ..we do a number of um, sort of uh..cognitive assessments leading up to the more..um, formal exams, so I'm in charge, I'm still in charge of organizing all of the cognitive assessment exams that we do through agencies in the U.K., and..then I was at the time, in charge of all the um...ITCSC examinations and AP examinations...that..in coordin...in terms of coordinating all the ordering and um..organizing all of the the invigilation of those exams, that happened here at the school

I: mhm

S: So that was a ... a pretty involved role. I: mhm

S: and..that then led me to a whole school data management ..uh..position, where I'm in charge of tracking all the progress for all the pupils in the entire school.

I: wow

S: So, organizing spreadsheets and uh, liaising with the directors of the different departments and the different year coordinators so that they're aware of where..where and how the students are making progress. And um, yeah..it's involved recently getting a whole new management information system put into the ..into place at the..at the school, so we're currently switching from...uh, I don't know if you're familiar with ..uh ...FA web or Blackbod, in the UMS, we're switching more to the um, capita based product called SIMS, which they use in the U.K. schools

I: Ok

S: that we're just doing that and we're trying to now work on the virtual learning environment to try and get that in place next school year.

I: mhm. And it looks like um... from your survey, you said you were recruited for the role by an administrator or a principal?

S: Yep

I: How that...how did that come in to play?

S: Um, it was at the time, I think she was interested ...there was a couple of options on the plate..uh on a table, I was interested in filling the head of mathematics at the school..and ...or having a more whole school role,

I: mhm

S: which was the head of uh..data management. And ...um... the school was just going through some transitions and they wanted me to know that that was sort of the.. the enticing offer.

I:mhm

S: that the um, that the head of exams was ..a rather involved role, and (laughs) quite stressful and not terribly rewarding

I: laughs

S: It just provided a whole new uh, avenue I:mhm

S: something I ..yeah

I: and, was it ..um..as far as being recruited, would you consider that being um..were it was more formal or was it more of an informal process?

S: It was ...at more..it was quite an informal process, really I: ok

S: yeah

I: Like you had a conversation with that administrator...and

S: yep, yep and it was like..do you want to consider either head of math or do you want to consider this option that we..we envision a future for you

I:mhm

S: and I though, oh, this sounds really interesting and kind of cool I: mhm, and so you were really given the choice between the two S: pretty much, yeah

I: yeah, well that's nice

I: Your..your reasons for being..um..open to it....being receptive...did you have any motivators that you thought ...I'd really like to

S: I thought it was ..uh...I thought it was the way forward, going in terms of career advancement I:mhm

S: that, one day down the road, it would open other doors, when, if you have a handle on um, how to make decisions based on um, on the data that you collected and ..and are able to present, uh, I just felt that that was a ..a better career path. Um, you know, it sort of ticked a box with doing the head of exams and this was something new, and a new challenge , and it's been quite interesting

I: mhm . And what have the outcomes been? For making that transition? You said the head of exams was a lot of work with out a lot of ...a lot of reward...

S: That was just a lot of ..it was just a lot of coordination, a lot of organization, um...you know, setting up schedules and trying to schedule staff around those exams,

I: mhm

S: Um, this one involves a lot more um..I guess meetings with department heads and directors of the departments and just ..it involves a lot more...I don't know,more of a whole school kind of feel, you...you really can get your finger on the pulse of what's happening in the whole school and help the department heads to make ...just uh, better decisions.

I:mhm

S: with regards to their curriculum, you can also help, like the pastoral teams track different pupils progress

I: Have you felt that serving in the capacity has ben an overall positive experience?

S: Oh, most definitely, yeah. Yeah, it's been a...it's been a good job. I quite enjoy it and it's been fun learning, taking ...getting the school to a point where...we weren't really doing any of this kind of thing, to a point where..uh, we've had the um, Association of

Independent Schools, the Canadian Association of Independent Schools come down last..in April, and...to do our ..you know every seven years they come and do an accreditation and talking with the people who are accrediting us, and realizing that we're leaps and bounds ahead of where they are..

I: mm!

S: in terms ... of the systems we put in place for data management I: wow

S: it's been..you know, a work in progress that I've been able to build over the last three or four years

I: mhm

I: And, do you feel that this leadership role helps you complement your overall goals in your position?

S: Um, sort of. Yeah, we'll see. I mean..uh, there's still lots of work to do and still lots of years of experience to gain before I..eventually finished. But..

I: mhm

S: I don't know..we'll...we'll see I: mhm

S: I don't know. I don't know where the ...where my path will lead me. I: But you're open to..

S: yeah, definitely, yeah

I: and I mention that because I think in your application letter to the MSSE program, you mention that um, you were interested in..like...working with the ministry of education, or some of those roles where you look like you have an interest in ...in that part of education as well.

S: Yeah. Well, at some time. We'll see, I mean things change as you get a little bit older don't they?

I: Yes they do!

S: You realign your priorities... I: Right, absolutely

S: Yep

I: And so, is your...right now your focus is ..you ..you enjoy having the dual role where you get to still maintain your classroom presence, but then also have this other leadership role?

S: Uh, yeah..it's ..it's a bit of that. I would like to go more away from the classroom if possible. I:mhm

S: But, for the time being I'm still in a position where I have to teach I: mhm

S: I would like to get away from the classroom at some point I: mhm

S: yeah

I: OK. How do you think your leadership..or if you could describe..how your leadership has progressed throughout your ...your career so far?

S: Um...in terms of ....since I became a teacher..or? I:mhm

S: I think it's just an ongoing process, you ..uh..pick up skills and gain experiences and gain wisdom as you get a little bit more uh, as the years tick by

I:mhm

S: and..eventually you ..you get to a..I don't know. You get to that sort of position where you can become more efficient with what you do,

I:mhm

S: and, you're able to provide some guidance for other staff members

I: have you felt like you've taken on more roles or have been more actively involved in leadership roles as you've gained experience?

S: Yeah, I think so. Definitely. I mean, I do... you get different things handed to you, um, I mean this was one that I've appreciated. There was the exams, and then, uh, I'm in charge of the Duke of Edinburg program here at the school as well, so ...and that one was one that was also just sort of uh...provided. There was no real interview for...it was like, could you take this on as well.

I: mhm. And what does that program entail?

S: That's sort of uh..a youth leadership type program, where the students are involved in..um.. not only are they learning outdoor skills, but they're also learning um..and recording their ..you know, their progression as they engage in physical activity, as they engage in some sort of charity within the community, and as they engage in mastering some kind of a skill, whether it be through the performing arts or martial arts, or some kind of uh..skill outside of the sports arena.

I:mhm

S: and so, they..they are meant to be doing all three of those activities in ..uh..alignment with the outdoor education that we kind of provide them with. And, at the end of uh...either a um 6 month period or a year long period, then they're provided an award certificate for meeting those goals, and so that's one more thing that..uh..I do here at the school.

I: mhm.

S: But..uh..at the previous school, there was only..there wasn't really any opportunity for leadership beyond teaching and coaching,

I:mhm

S: and here, at this school, they're...they're more ..uh..willing to ..uh..recognize you with a title and ..and..um, the responsibility of taking of these leadership roles. That's just two different teaching philosophies between the two different school I worked at.

I:mhm. Right. Do you feel like your involvement in the MSSE program contributed or helped you progress as a teacher leader in any way?

S: I think..it was the credential more than the program I:mhm

S: And maybe what you earn from the credential is just being able to carry out a ..a sort of a self reflective um..research project

I: mhm

S: I think, uh..I did enjoy and appreciate a lot the ..the course work and the flexibility in selecting courses in the program.. I: mhm

S: Um...in terms of career advancement, I think the only real things that I benefited from the program was maybe the capstone project and of course, the credentials. I mean, just having the ..the ability to say that you've completed a masters degree

I: mhm

S: the way it looks on the resume, um..very positively. Uh, I don't know if uh..you know..the courses were interesting and I appreciated the flexibility of courses and I appreciated the ..you know..the..the..ability to come ....you know, I'm from British Columbia, so to come back towards that neck the woods, so to speak,

I: mhm

S: I really enjoyed being in Montana, but ...and I've since gone back for vacations, cuz I like it so much, but um..beyond that, I'm not so certain that ..that it was a ...you beyond getting the actual credentials and doing the reflective self study..

I:mhm

S: a ..a whole lot more out of it in terms of preparing me for leadership I: ok

S: potentially, but I think there could be more ..um..leadership courses...and I think if..Uh..I was to pursue yet another post graduate degree, it would have to do one specifically in leadership I: mhm. In the ..in the um...though of..of MSSE ..um, trying to support to leadership development further...you mentioned, you know, maybe offering some courses..Is there anything else they.. the program could do to ..um try to help teachers that are trying to develop teacher leadership skills?

S: Yeah, I don't..specifically, I'm not entirely certain, I just think that maybe a component of the program could be ..you know, some ...some leadership or ..you know, some potentially pairing with other um, you know...teacher leaders

I:mhm

S: you know...um, we do..there's been a program on offer here at this school, uh..through the National College of ..of Leadership in the U.K.

I: mhm

S: Um, I hadn't signed up for it, cuz I've already had the masters degree, but it was uh, one of those things that provided some staff members with specific training in middle and senior leadership positions...and, you know, potentially I think that would be beneficial,

cuz I know a lot of people, especially a lot people who come from...with my educational background, coming from Canada..

I: mhm

S: uh, you tend to just sort of tick the box by getting the masters degree and that would enable you to move into administration. Um, it doesn't ...it helps here in Bermuda, but not specifically I: mhm

S: cuz they recognize other pathways to leadership..but in..in the Canadian system that I came out of ...was what..and it was very popular for a lot of teachers to simply tick the box and get the ..the masters degree to..to then be able to proceed towards leadership

I: mhm

S: without really having a whole lot of courses in leadership..and for me it was an appealing course, having a..you know, been a wild life biologist and having done my back..you know..had my background in um..in the sciences

I: mhm

S: I just think to be able to get a masters degree and sort of bone up on some of the science courses that I found..you know..interesting

I: absolutely. You did mention the capstone, a maybe being a component that did help you...help contribute to leadership?

S: Yep

I: What part of the capstone do think was...was beneficial in that? S: I think the...you know, the...potentially the rigor of the capstone. I: mhm

S: Um...I worked with Walt, and he was fantastic as a capstone advisor. I also worked with uh...coincidentally my..my step-dad who is a PhD as well, and he was very rigorous in terms of his demands

I: laughs

S: asking you to be really reflective on what it is that you're doing and..and to provide evidence for what it is that you had done. And ..and to analyze that evidence..and that..you know..has been useful here

I: Especially with your specific role, I imagine

S: Yeah, yeah, you start looking at ..at data, looking at evidence, and looking at trends ...yeah, it has been quite useful.

I: mhm

I: Have there been any specific factors or triggers that have um..motivated you along the way to move into or accept additional leadership roles?

S: Uh, what has motivated me? I: mhm

S: I think it's just ...the..you know, it's just a personal preference, I like to be more..more involved in the decision making at an institution, I'd like to be more involved in ..in the generation of policy at an institution...um. more so than the love of that...as a..really a passion ..it just seems to be..that seems to ...it's just my..my personal preference. I don't necessarily ...you know, I don't mind teaching, but I would....I've done fifteen years of teaching, I'd like to move into, you know, into the next phase of ...of it.

I: mhm...mhm

I: With your..um..with your data management position, is that where you're having to do any sort of presentations or how do you..how do you share the data so that it affects other teachers?

S: Uh, there's ...uh, initially it was a lot of presentations and coaching of staff to try and get them to start to utilize the data and ...uh, now that the systems are in place, there's more...there's a lot less of that.

I:mhm

S: it's just a matter of...you know, taking the processes that I've...you know, put in place and some what automated and ...and generating the data and ..and you know...uh, sort of transmitting it on to the different uh..people I work with who are going to utilize it.

I: mhm

I: So it sounds like you've been able to use the program (data management) to really change um, how things are done in your...in your school, which is positive.

S: Uh, yeah. It has been a positive transition, over the last three or four years. At least four years now that we've been working towards getting data. Um...no three years, it's been three years that we've been working on this and getting the data up and running...

I: mhm

S: and...getting people to think from that ...sort of perspective. But I still think that we have a long way to go. I mean, there's other things that I've been researching today and trying to

...um, learn more about to try and you know, do a better job of it.

I: mhm

S: and..you know, utilize it to make more um.....you know, more involved decisions. I think it's still ..you know we're not..it's not in it's infancy any more, but it's definitely still ..um, school-aged. We've got a long way to go.

I: mhm

S: But I think that it's important that we recognize that and are willing to do the work..to get ..get it to that next stage

I: mhm

I: Well, I really appreciate you taking the time to uh, meet with me, and if you have any questions for me, or anything that you'd like to further add...

S; Yeah, no worries, I hope I've been helpful.

I: mhm

S: and you know, I appreciated my time at the school and I wanted to give back a little bit if possible

I: mhm

S: yeah

APPENDIX H

MS. STAHL TRANSCRIPT

**APPENDIX H**

Ms. Stahl

I: Is it ok if I voice record this just for clarity?

S: Yep, that's fine

I: um, so I think first, um...If you want to just tell me a little bit about your current teaching position? I have your new resume where it shows that you're in ..um, you're at Sakakawea Middle School?

S: Yep.

I: Do you want to tell me just a little bit about..like..the size of the school, how many ...how many kids you have, how many teachers you have...

S: Yeah. So, let's..um, I teach 7th grade and ..on our team, I think I have 120 uh students on our team. And there's another 7th grade team who also has similar amounts

I: mhm

S: So let's call that 250 kids per grade

I: mhm

S: Um, so we're a 6th-8 school, um..and so that probably puts us at somewhere around 50 teachers

I: mhm

D: total in the school. There are two, uh, science teachers in each grade level

I: Ok

S: and..we're currently in the process of expanding, and so, probably..maybe not next year, but the year after, we'll have 3 ...3 uh, grade level science teachers per grade.

I: mhm

S: Um, and ...we uh..pretty awesome demographics of students. Um, we're really close to MSU, and so we get a lot of students whose family members work at the university, like professors or research fellow or what not,

I: mhm

S: Um, and so we have a very, um motivated student population, and uh..with high regards to like academic success and um, like school is important to a lot of our kiddos

I: mhm

S: which is really nice to work with

I: mhm

S: um, we have a fairly high socioeconomic status, um..most of our student population is white, caucasian..I would say.

I: mhm

S: Um, and I have 4 sections of science, and then one section of accelerated math that I teach.

I: Ok. And then, on your survey, you indicated that you serve on an NGSS committee, and then on a grading committee.

S: Yes. um..

I: Do you..

S: So we are in the process of..Montana is kind of trying to figure out a time line for adopting NGSS

I: mhm

S: Um, and ..our district is definitely waiting for our state legislature to sort give guidance on that, um...but a number of teachers and I have sort of decided that we can see it's coming, and so instead of waiting for the like, 'Hey, now go do it.' We're working

extensively this summer to try and revamp some of our curriculum standards to be more NGSS aligned.

I: mhm

S: um, and then..our district ..uh, started..motion to move towards a performance based assessments. And so it happens in the elementary schools and then doesn't happen in the middle schools. And so, I've been on a committee this year to try and think about that would look like to bring performance based assessments uh, to our school, um..and how can we sort of transition our teaching model and our curriculum and our practices to get that into the classroom. Um, and so that's one of my projects for the summer, um..is to..and it's one of the things is..uh..the 7th grade science teachers from both the middle schools here in the district are meeting together this summer for a couple days, to sort of try and do both those things at once. Uh, NGSS and performance based tasks

I:mhm

S: we're working kind of all at the same time.

I: mhm

S: so...I'm kind of excited that instead of waiting for permission, we're just (laughs) kind of doing it, cuz no one is actually doing anything.

I: mhm. Right.

S: so we do it, so

I: Right..And then otherwise, you wait, and then it's it like, oh..now we need it all done now. (laughs)

S: Right, and I was like, well, why don't we just..like..do it right now, and then I can..when you're ready to say 'Ok, we should do it', I've already had a year of practicing some of that, so.

I: mhm. And, so talking a lot about, like, the team ..the team involvement.

S: mhm

I: Can you describe anything else, or other things that you..that you do in um, in the building or in the district as a teacher leader?

S: Um, so we have a couple different um, things that within..like the ..um, what do I call it...our teams, we have uh, actually let me back up. Uh, we have this committee called the teacher resource team, and for a lack of a better word, um, it's sort of like a group of teachers who volunteer to talk about how we can make our school better. And so that's something that meets probably, twice a month. And we just meet after school to talk about like..what's working in classrooms, like, what's not working in classrooms, what're..you know, some of the needs, aside from academic needs of our middle school students, and how can we get those met.

I: mhm

S: Um, and so..teacher resource team does cool things, like with our..we have an advisory program, so we've sort of developed activities that other teachers who might not be as ..as invested in advisory or don't know about it and how to get started in an advisory program, can utilize some of those activities. Um, and we have student led conferences where ..um, students essentially present a portfolio of their work

I: mhm

D: an so, um, the teacher resource team sort of created some guidance again for teachers who might not be as invested or have an awareness of what student led conferences are and, like, ways to help them succeed.

I: mhm

S: and getting their students ready to succeed at their student led conference. So..

I: and those are things that're more..building wide?

S: Yeah. That's a building wide thing, for sure.

I: mhm

I: And then..um, the ..with the team type activities, do you end up having to do any sort of presenting or providing professional development directly to other staff?

S: Not yet, but that's..that's what my principal and I were sort of talking about, things for me for next year. Um, and that's a hope for me, to sort of, in the long run, um..try to do some more instructional coaching.

I: mhm

S: um, and, trying to lead..so, me getting sort of the ..I was the one kind of organizing the uh, NGSS and um performance based grading things, going, cuz no one else was doing it and so..He's like, that's a step in the right direction. And then, once get that going, I'd like you to try and teach more workshops to other non-science teachers, or the right grade science teachers, for example, on how you've been doing it in your classroom.

I: mhm

S: so, that's in the works, but..not..not yet. It's my 2nd year in this district, so..

I: mhm. And, in your survey you indicated that you were recruited for your roles through a co-worker?

S: Which role?

I: I wonder if it was the grading committee...or?

S: That one, probably the grading committee would be my guess.

I: Ok. How .. how did that- and you can talk about both, like the NSS team, and the resource team, and, just how you ended up in those positions?

S: Yeah, so..the ..let's see here, the performance-base grading, so when I ...I worked in a school in California and we were just starting to do that, um..and using ..for transitioning our report cards and accounting systems for kids and teachers and families, their report cards for example, and we were sort of in the process of doing that. So when I came here, um, just in talking to my principal when I was initially hired, we had some conversations about that. Um, and then when it..it kind went on pause for the first year that I was here, probably in part just cuz I was A) my first year here, and B) was pregnant and then on maternity leave (laughs)

I: mhm

S: I had other priorities going on.. um, at the end of that last year, um, Hughes got back to me said, we'd like to try and bring more of this performance based learning to our school and we....you used a little bit of it in the past, so how can we, you know, get your perspective on this.

I: mhm

S: Um, and it's..I'd probably say the same with the teacher resource team.

I: mhm

S: Um, is that..my principal is pretty good about sort of saying, hey, would you be interested in um, doing such things..anyone who's interested can come.

I: mhm

S: Um, but then, like with the NGSS, no..is it NGSS..it's the career and college ..wait what is it called? Career and college readiness framework committee, that's what it is,

I: mhm

S: I'm sure it was my principal that, uh, I just got one those 'hey, you've been nominated to be part of this committee,' but I had no idea what it was (both laugh). I was like, uh, I

think I have to go to that. (laughs). So, my guess is that was my principal, but I don't actually know who nominated me for committee participation on that one.

I: mhm.

S: so ...

I: What do you think your motivation has been behind feeling like, ok I can fill this, I'll accept, you know..I'll accept this responsibility? when you're being kind of volunteered to do things?

S: (Laughs) Yeah, um, I mean, most of them I'm not volunteered, most of them I was volunteering myself.

I: mhm

S: um, like the NGSS one, or the performance based grading. I think part of it is that I can see what I think is best for students and um, I'm fortunate that I came from 2 really small schools, where there wasn't like big district oversight, and big sort of committee planning and so, I'm very much used to like, ok if I want to make this thing happen for our students, like I just go do it.

I: mhm

S: Um, and so I think that's part of ..for better or worse. Sometimes I'm really frustrated with like the glacial pace with with things can move in a larger district.

I: mhm

S: um, and so..my own motivation is like, when we're all talking about how, for example, NGSS is really great for kids and we're all just sitting around waiting for someone to tell us what to do. And was like, well..can we just do that and just get the ball rolling ourselves?

I: mhm

S: Um, so my motivation is probably selfish, that I'm just like, tired of waiting for someone to tell me what to do, and I'd rather, you know, sit down over the summer or go to workshops outside of class..outside of school to brainstorm with colleagues about what that would actually look like..

I: mhm

S: And create those performance tasks, or..whatever

I: And, with your involvement in the different leadership roles, have ..um, what kind of outcomes have you had?

S: I mean, nothing yet cuz I'm so new

I: mhm

S: but..other than, than..that turns into more people wanting you to do other things

I: mhm

S: if that makes sense. Where, um, you know..our assistant principal is like 'Hey, you might be interested in doing this workshop this summer' or..like I just uh, decided to do this..I got nominated last year of um, this grant at MSU to do a week long, like, mathematical modeling workshop. Um, and so..I couldn't do it summer, but so I was doing it now and it's like, it's like it's sort of a consequence of people being like 'Oh, you're ..you know..invested or excited about doing these things here, so I'll suggest that you participate in this other thing.' So,

I:mhm

S: that's probably an outcome I would suggest, or say, is that ..it is additive

I: mhm, mhm..And do you feel like your involvement in the various things has been a positive experience?

S: For the most part, yeah.

I: mhm. And when you say, for the most part, have there been some things that were negative or..

S: Um, I mean, mostly it's just like the.. I think the driver in me, and my own personality that wants things to happen faster than they are likely to

I: mhm

S: um, and ..so..I've been frustrated only that we'll like, have a day that's dedicated to professional development related standards- based grading, and at the end of the day, I'm like 'Cool, we got nothing done. That would have been a great...you know, we just had like theoretical conversations and we didn't actually sit down and plan anything out.'

I: mhm

S: Um, so that's I mean for the most part, is like..it's fun and exciting to think about educational policy shift or instructional planning shifts, but um..actually getting it, you know, sort of boots on the ground changing is where I feel frustrated

I: mhm. How do you think your leadership role- and you have quite a few- your different leadership roles, how do you think they complement your overall goals for yourself in how you see yourself in your career in education.

S: In a couple really ways, the main thing for me in the long run, I'd like to get into instructional coaching or um, teacher teaching, um

I: mhm

S: and..sort having a better perspective of like, you know, what's happening at the.. in the classroom level, at the district level, or at the department level, the school level, the district level, I think is ..is good in A) sort of establishing my awareness, but B) establishing my network of connections of people who are involved in those things,

I:mhm

S: you know, in our or department or district, or state wide

I: mhm

S: so..

I: And in the, like the instructional coaching kind of thing, would you..um..have a more of a science link, or are you kind of thinking it wouldn't really matter?

S: My..I would love to do science.

I: mhm

S: Yeah, I think, um I was fortunate to participate in a teacher institute in California, um.. and they were really big on..at the Trudy? Exploratorium, and they were really big on hands on teaching practices, especially at the middle school level. Um, and ..um, I think we can bring more of that to our science curriculum here. Um, you know teachers are..teach on islands at some of their life, or we all teach in our own little rooms and shut our doors, and how do I help teachers have better practices?

I: mhm

S: Um, and better for students. Um, I would love to do math and science because um, Montana's kind of interesting int that most of our middle school teachers were k-8 certified, which is great, but also challenging in that sometimes the content knowledge suffers

I:mhm

S: because, you know, you teach..take one math uh, methods class and one science methods class and your teacher preparation courses and then you're expected to teach all of the math and science at the middle school, and so..um, I think a lot of our teachers have room to grow in their sort of best practices, um..for math..I mean for all subjects, but

I: mhm

S: because I'm more familiar with math and science, that would be what I wanna rock on.

I: mhm. Over your..your teaching um, your teaching career, do you think that your leadership involvement has progressed?

S: Sure. Yeah.

I: Do you think...

S: I think when you first start out, you're like so..head in the water, trying to keep it above water, that you can't think about... progressing.

I: mhm

S: Like someone else's teaching, cuz you're just so ..sort of self focused.

I: mhm.. Um, and do you think that your involvement in the MSSE program impacted that progression in any way?

S: Um, maybe. Um, I think..it's hard for me to say because um, I was halfway through the MSSE program when I left..I transitioned schools,

I: mhm

S: um, I mean, I chose to do the MSSE program because I was ..I'd been teaching at one school for 4 years and was kind of feeling like I was needing some more professional development myself, cuz I wasn't getting it at my school,

I: mhm

S: um..and no one was, you know, focusing on me, and so I felt like I needed more, like deeper content knowledge and you know, some pedagogy classes, um..so that's why I initially did it, s it's hard for me to say how.. if its changed as a.. as a function of MSSE program because I changed schools

I:mhm

S: sort of in that process, um ...Uh, I would say if nothing else, it's given me more confidence

I: mhm

S: in terms of like my, um, own content knowledge. I'm lucky in that, you know, I did the MSSE program and then moved here to Bozeman, and so some of the..the professor that I worked with, I can now reach out to in my classroom and have, you know, some of those teachers who did, like, the field courses come in, and do a workshop with my kiddos.

I: Oh, that's awesome.

S: That's really sweet, you know, to get Dr. Rotella to come in and do a bird banding lab..

I: Yeah!

S: or Dr. Willy to come in ..like do a thing on owls. Like, I'm really lucky in that sense, and it's only because I live here that ..(laughs) ...I get to do that, and then be able to connect with their....those guys to work with you know, Montana Fish, Wildlife, and Parks.

I: mhm

S: ...it's like, because I live here, not because of the program..

I: mhm

S: does that make sense? I mean, the program got me to those people, and got me to live here, but..uh..it's sort of separate

I: mhm. You did mention, um..confidence. Do you feel like the program really helped build your science content knowledge or

S: Yeah, I mean, I think that, you know, one of the challenges in most states, is that..um, so many states, you know, you get a general science degree and then you can teach any ..you can teach any and also you're expected to teach any sort of scientific content from 6th through 12th grade.

I: mhm

S: and, I think that's a lot to expect of teachers to really have a deep content knowledge, um if they didn't, you know, have as extensive science background in that one area, you know. So..if you're more of a biological scientist in your academics, but then you're suddenly teaching environmental science, you're like..like, I haven't done as much of that, so I need to learn it.

I: mhm

S: Um, so that part for sure, you know, when you're teaching...you're taking whatever, you know, astronomy class through MSU that's a college level graduate class

I: mhm

S: and then you're teaching it to either a middle schooler or a high schooler, you know it so much more. You're like, I can speak with much more authority

I:mhm

S: because I have a much more recent content knowledge of it, so..and that was part that has been really too, just like, the going back to school and like..here's like, the cutting edge of what's happening in science right now versus when I took, you know, this biology course, 15 years ago.

I: mhm, mhm

S: Um, and how things have changed, and so speaking with a little bit more authority. But like, no, here's how this thing has actually changed recently, or what's a new

development with this thing and so..um, yeah I would absolutely agree that it deepened my confidence and that um, I didn't have as many of the sort of graduate level or higher level science classes in my undergraduate just cuz the nature of my degree, so

I:mhm. Do you think there have been any specific factors or triggers that have propelled you into a leadership role?

S: Um, I don't think so. Um, I can't sort of pinpoint one or two things...

I: mhm

S: Um, I think more than anything, it's the..my own drive of coming from a smaller school to a bigger school, and wanting things to happen uh, instantly (laughs)

I: mhm

S: and getting frustrated that they're not, so..yeah

I:mhm. In what ways do you think that the MSSE program impacted your ability to act as an effective science teacher leader?

S: An effective science teacher leader..um, I think one of the things that I really took away from my MSSE was that more science teachers need to be doing science, um..so when I did my capstone, I did a science research based capstone project

I:mhm

S: um, and for me, that was really important that I took away that like, science teachers need to be out connecting with..um, science..scientists in their field

I: mhm

S: Um,..because that's how I think we get kids excited about it and keeps our current practices..I mean, our ...our practices current.

I:mhm

S: Um, and..I think we do a disservice to our students when we're not actually scientist, if that makes sense

I: mhm

S: um, and that was really important for me cuz I felt like, um, a lot of our, like the action research projects, that I was initially thinking about doing, um, were an island of isolation and they weren't connected to the larger scientific community.

I: mhm

S: And..I think that does a disservice to our students and it continues to perpetuate the idea that, like, science happens in isolation

I: mhm

S: and it's, you know, a thing you do in school and that's it. And I..I think that we're missing a whole group of our student population by not being scientist ourselves to the best of your ability.

I: mhm

S: and that's you know...you're always trying to go out and like, get a paper published, but, you know, connecting with local wildlife agencies, or universities or whatever the sort of local regional, like, offices are. And getting those people into your classrooms and figuring out, how can my students get out and do some data collection for these people

I: mhm

S: even if it's like citizen's science class, just I think that that..that was my big take away, that like, in terms of leadership, and I've been really pushing are science teachers here to like, connect with more science teachers, I mean more scientists in our community.

I: mhm

S: um, I've..I feel fortunate that my principal's...maybe skeptical, skeptically on board, but he's on board with that.

I: mhm

S: Like, he just gave me two days off last week to work with FWP to do an elk capture.

I: Oh, cool

S: Which was great, yeah, so..

I: Did the MSSE program provide any specific support in the development of leadership skills, or any specific opportunities?

S: Uh, no. I don't think so

I: mhm

S: Other than connecting with scientists, but that's partly unfair

I:mhm, mhm

I: Was there a specific course or an experience that helped support your development as a teacher leader?

S: Um, maybe..I took John Winny's ..uh, he had this advanced ecology course over the winter one year

I: mhm

S: and I took that course, um, and ..John was really good on that course about like, we went out and just did some really basic data collection. Um, on his..um, course. And you know, as frustrating as it was in the moment, I remember feeling like, actually this is so important because this is what we do to our students all the time, and it makes me as an educator think about like, how do I give my...my kids more time to do experimental design.

I: mhm

S: Um, and so, I think John's course was good for that cuz it actually, that was what then pushed me to be like, oh, I should do my scientific research thing versus an action research one.

I: mhm

S: Um, cuz it really got me thinking about how hard it is to do really good experimental design.

I: mhm

S: um, and how I have my kiddos do that, so..

I: mhm. And you mentioned your capstone project. Do you think your capstone project helped support your development as a teacher leader?

S: Yes...um, yeah, I'm hesitating only because it's like, in isolation. Like, I did it, and I um, have shared it with my students,

I:mhm

S: and that's something, like, you know, we have talked about in my classroom, but it's not something I have shared with other teachers.

I: mhm

S: um, so..I say yes, but that's kind of a hedgy yes.

I: mhm, mhm. Do you feel like from the ..the process of having done it, you feel um...more comfortable sharing things with other teachers in general?

S: Oh, sure. For..absolutely.

I: mhm

S: yeah..I mean, cuz at that point, you've um, you know, had so many people in the MSSE program, like, look at your work and give you feedback on your work, that just that process, like, that sort of peer vetting

I: mhm

S: makes..I feel like now, I can crank something out much faster that's much more polished.

I: mhm

S: um, because I just had so many people, like, looking at my work and whatever..um, so..I'm much more willing to take that risk, and be like, yeah, sure, let's ..let's look at this thing together that I made.

I: mhm. You're more willing to share things?

S: Sure.

I: mhm. Um, in the spirit of continuous improvement, and I say that because most of the feedback from the program is pretty positive, um

S: mhm

I: what more do you think the MSSE program could do to further support your leadership development?

S: Um, ....um, I mean I think if they're really thinking about teacher leadership development, having a class oriented towards um, like..teaching other teachers.

I: mhm

S: so we do a lot of stuff about, you know, how to help ..in whatever 504 classes..helping..you know, you teach your students, but I ..I don't think there's as much emphasis on..here's how you could apply this to your grade level or your, you know, content with in your school or your district, and so..and I don't know exactly what that would look like.

I: mhm

S: maybe that's a section of one of those, you know, education classes, but..um, I think you know, even just giving opportunities for other teachers to talk about, well here's what I'm ...something I'm doing in my district that is teacher, that's helping teach other teachers about this.

I: mhm

S: um, there's not..other than if you, like, strike up those conversations individually with people, you don't really ...that's not something that's ever..I don't think that was something I was ever, like nurtured in.

I: mhm. mhm

S: For me, it never seemed like the MSSE program was about teacher leadership, it was more about..uh, your own personal development and how you're going to personally improve the lives of students in your classroom, but not thinking about, ok, now if you want to be a mentor to other teachers, here..you know..there needs to be like a leadership institute.

I: mhm, mhm

S: um, or a leadership class. If teachers want that kind of thing..

I: mhm

S: Um, that was one of the things that like..the Exploratorium does really well. Um, in terms of like, having mentor teachers..as for new beginning teachers, and that was ...you know, that's an area that I think that MSSE could grow, is like..so many teachers who are doing it have been teaching for a couple years and are ready to start thinking about mentoring younger teachers or newer teachers ..uh, cuz that's partly, you know, why you're pursuing a masters', is you're thinking about your own professional development

I: mhm

S: but there's nothing really physically dedicated to that ..like a leadership institute

I: mhm

S: kind of thing

I: mhm. Is there anything else that you'd like to share?

S: I don't think so ...as it relates to what you have going on..

I: Ok. I really appreciate you taking the time to visit with me, and I will transcribe the interview and then I will send you an e-mail, just to make sure that it represents what you said and if um..you just scan through it check that..I didn't type something in weird that doesn't make any sense.

S: yep

I: And um, yeah..thank you so much, I really appreciate it.

APPENDIX I

MS. JESSEN TRANSCRIPT

**APPENDIX I**

Ms. Jessen

I: Um, is it ok if I record the conversation?

J: Sure.

I: Do you want to first tell me a little bit about the school you teach in just to set a context.

J: Sure. Um, I teach at Robinson secondary, and this is a large school in the suburbs of Washington DC, we're strictly speaking in Northern Virginia

I: mhm

J: Uh, the school has grades 7 through 12 and there are about 4,000 total students, you know, so the classes can be as big as 700 or so.

I: mhm

J: Um, it is an international baccalaureate school, are you familiar with that?

I: No

J: Ok, international baccalaureate is a program, um, that started in Cardiff, and ...it's prime...it was primarily for the children of diplomats, who were, you know, constantly moving around the world, and being um, set under the guidelines of all these different curriculums and different programs, and so, they wanted to have a program for people who, you know, had international jobs, and so they..they started this international baccalaureate

I: mhm

J: Um, we have probably about 100 of our students um go through the program, so extensively, they actually earn what's called the IB diploma, and it's very, um it's very rigorous, I don't know that I would have done it myself, um, my children went to the

school where I taught, and neither of them wanted to pursue the international baccalaureate diploma

I: mhm

J: but, a lot of students, a huge number of students at our school actually um, take a couple IB or AP ...you're probably familiar with that, you know, AP classes

I: mhm

J: And um, that has allowed the school to be, you know, categorized as a fairly prestigious school in terms of, you know, SAT scores and the percent of students who go to college and things like that

I: mhm, and is it a public school?

J: and, yes it is a public school

I: ok, and then you're current teaching position is?

J: I am currently the assessment coach, so although I was a physics teacher and a department chair when I went through the MSSE program, I am no longer in the classroom.

I: Ok. And when you were in the classroom, what grades..what grades did you usually have?

J: 11 and 12

I: 11 and 12, ok. And so now you're completely removed from the classroom, and you are working as the..the assessment coach?

J: Right.

I: Do you want to tell me a little bit about what that looks like?

J: Sure. Um, it varies depending on what time of year we're talking about

I: mhm

J: Um, right now, I just finished a huge testing window where we um, administered 10 thousand online tests,

I: mm

J: so that the students could have the credits that they earned from their classes verified by the state. And, the way that they do that is you...the tests are scored out of 600 and the students have to score 400 as passing. And they have to, for instance, to earn the standard diploma in the state of Virginia, they have to earn 6. Um, English reading, English writing, um a math, a science, a history, and then 1 of their choice.

I: mhm

J: So... that earns them the standard diploma. If they do it..3 more, if they, you know, it's basically any three, three more, then they can also earn what's called the advanced diploma.

I: mm

J: Um, so, you know, right now, we just finished ten different tests for ten thousand students

I: mmm

J: And, that doesn't include the middle school. I primarily just focus on the high school.

I: mhm

J: Um, but during the year, we do a lot of other testing, so for instance, you know that..right now, I've got some kids who were absent or they had concussions or ...for whatever reason, they didn't...they weren't successful this time and they were underclassmen. So they might go to summer school

I: mhm

J: then they...when they show up in September, I can test them then. But that's usually a really small group. Um, but I actually you know, will meet with the kids one on one, I get to know them by name, I see them in the halls, um..I give them resources where they could practices, I give them suggestions of some mentors...mentor teachers at school who could help and then, the process just continues to kind of escalate from September toward May with, um subsequent testing sessions. So for instance, in October I will test all the seniors who did not pass the writing exam when they took it as juniors

I: mhm

J: and um, just in the two years that I've done the job, we've gotten that number to be smaller and smaller because we find other substitute tests they can use, so for instance, they....a student who transfers to Virginia from out of state, um if they're a really sharp student, as a senior, we know they're going to take the SAT or the ACT

I: mhm

J: And then they can...we can do the paperwork to get their score um, credited as a substitute test.

I: ok

J: Um, the kids who don't pass in October, I test them again in December, in January all the kids who've transferred to our school, we offer them a ..an opportunity to try to take some tests that's same going to be the same time of year when they would take all their other tests. In March is when we do the writing test and we do that separately because the kids literally will write an essay to a prompt,

I: mhm

J: and um, it has to be scored and that takes extra time, so we ..we do that separately

I: mhm

J: They just started scoring that with a computer

I:hmm

J: which is..I think is interesting, so there is one human and one computer that scores it

I:hmmm

J:Um...yeah, so that's..that's my job is...is all the logistics, everything that goes on behind that. And the hardest part is like, the homebound population

I: mhm

J: trying to either get them in or get paper tests so we can send a teacher out to their school or to ours to get them tested. Or um, the special ed population. The who, like call out or have Touretts or something like that, that you can't really test them with other students...

I: mhm

J: Um, and I have to test them in a separate room, and then the state says, oh well we don't want that teacher who's in there to possibly be, you know, giving them any kind of hints or tips or guidance, so we have to put a second person in there (laughs)

I: mmm

J: So, yeah, it just becomes very challenging from that regard

I: And you said you've been in the position for about 2 years? Is that correct?

J: I've been in this position for 2 years, yes.

I: And before that, that was when you were in the classroom teaching...high school science?

J: Yes, I taught physics.

I: Ok, and in your survey you indicated that you applied to move into this assessment and instructional coaching role

J: Correct

I: And so..um, can you tell me a little about what that process looked like and ...and maybe why you were interested in the position?

J: Education has changed a lot from the time that I got into it, and ..the thing that happened at my school is we had these, um...gross in use of cellphones, and some of it was good and some of it was bad, I mean, there are teachers who use them very well, and they will say 'Ok, we're all going to..you know...go and see if we can use our cells phones, as...you know, our smart phones to find information that we're learning about right now.' Or they have apps that they can use, and they'll throw up a multiple choice question, the kids can respond with a ..a text or something like that.

I: mhm

J: So there were teachers who were using them well, but, you know, it's so tempting and you know, when you have teenagers, it's really hard. (laughs)

I: mhm

J: And so that..that became a ..just a source of frustration when our administration changed. And the administrators were not willing to support staff when it came to having troubles in the classroom with dealing with stuff like that.

I:mmm, mhm

J: Students using them inappropriately

I: mhm

J: So that bothered me, and then I just felt like it was time. The international baccalaureate program had just drained me, I mean it is so demanding and I had been given...um, each teacher at our school teachers 5 our of 7 classes and typically it's nice if you can have 5 non-IB class..or 3 non-IB classes and 2 IB classes or, you know, the other

way around, 2 um, non-IB and 3 IB, but ..I was given 5 year after year after year of the IB and in the IB program..there are just so many um, demands.

I: mhm

J: We have to be moderated externally, so students have to write up labs and then I have to score them and then a sample is sent in to Cardiff or wherever they get sent around the world, and they will go ahead and look at them and decide whether I'm grading right or not.

I: mmm

J: And if they decide I'm not what....like, when I was first learning it, um, there were times where out of 50 points, you know, they would come back and say, these..you graded them too leniently, we're going to mark every body down by 8 points.

I: mmm

J: So that was heart breaking, cuz, you know, I had done my best but I obviously wasn't good enough in their eyes, and then they felt that I was being too lenient so all my students' grades were dropped

I: mhm

J: So that was..that was really hard to learn

I: mhm

J: UM, but it was really time consuming, you know. You couldn't ignore whether the student should have had 2 decimal places or 3 decimal places, you had to be really really nit -picky about every single thing they did in the lab and it was just..I had no life

I: mhm

J: outside the classroom, and I have a family!

I:mhm, and with the 5 classes like you said continuously

J: Yes! And then I would say to um, our administ..the science administrator, we really need to train more people so that, you know, I'm not the only one teaching the higher level class. We had um, a ..an introductory class, and then a higher level class, and a..a standard level class for the seniors, and so I was teaching like 3 of the introductory class and 2 of the higher level class and I said, you know, we just...we had six physics teachers at the time. I said 'we need to split this up so we each have a little, rather than, you know, you're pushing us into the ground, the way some of are.'

I: mhm

J: And, they just were never willing to tell those other teachers that they needed to teach the IB program or to train them

I: So there were some on staff with you that didn't have any of the IB classes?

J: Exactly.

I: Oh, ok. So really almost...an unfair distribution of labor (laughs)

J: Yes! Yeah, and you know, they..I mean, they good reasons for not wanting it, they think..these were the more demanding parents, and these people, some of these teachers had had a record of not doing that..dealing with teachers, er parents very well

I: mhm

J: So the administrators weren't willing to put them in that position, but I mean, just 1 class would have been a relief (laughs)

I: Mhm

J: yeah

I: mhm. So then, you sought out this new position as almost a way out of that?

J: Right. I felt, you know after multiple years of my saying 'I can't do this another year' and having them continue to do it, I just said..'I need a way out, I need to do something

for myself.' I still wanted to be part of education, but between the administration that had become less supportive of teachers in general

I: mhm

J: and um, my feeling like I had no life outside the classroom, I...when the job opportunity came open, I said, I'm gonna go for it.

I: mhm, and then the application process? What did that look like?

J: Um...

I: Was it fairly formal?

J: It was formal, yes. I had to sit for an interview and it was um, the person who ultimately is my boss and she's the director of student services. And then there was a panel of um, other people who had similar positions or with whom I would be working

I: mhm

J: So for instance, the coordinator of the IB diploma program who also has to deal with logistics and work on, you know, there tests, they would know a little bit about the testing side of it, so that person sat on the panel. And then, one of the teachers who um, was part of the science team...she ...she was there, so

I: mhm

J: she kind of knew about what kind of person I was as a science teacher

I: mhm

J: There was a 4th person, but I can't remember who that was right now (laughs).

I: Sure, yeah.

J: Yeah, so I sat for an interview, I mean I studied up for it, you know, I went online and I found out everything I could about the...what was available from the county in terms of the job description, and then I..I looked up all the possible tests that I could be in charge

of and I...I researched what our schools scores were and all that kind of stuff, just like you would to be prepared for any kind of interview

I: mhm

J: with ..with any business

I: And how do you feel like moving into this position has um, changed how you act in a leadership role in your school?

J: I don't know that it has, to be quite honest, and this has kind been niggling around in my mind since, you know, you put out your questionnaire. From the time I was a tiny girl, um, my mother said I was bossy, (laughs) which I guess is you know, I'm 54 now, that..that was what they called women who had strong opinions

I: mhm

J: back in those days. Um, so I was bossy as a kindergartener, you know, and I knew how things should be organized, and um I always...I was always a leader. I ..middle school, I was my class president, and so, I always sought out leadership positions.

I: mhm

J: So I don't really feel like it's a new thing for me.

I: mhm, and what kind of things do you do in this position that you feel would be encompassing of ....of being in a leadership role?

J: One of the main things that I need to do....that I do, is um, I sit in a major role in the school improvement plan.

I: mhm

J: So, I am as the...as the person who has control over all school's assessment data, um I am the person who get queries.....everybody queries me for things that are weaknesses

for our school, on how we can improve it, and as a result, I have a pretty significant role in the ....in the school improvement committee.

I: mhm, and um, how do you think the outcomes of this new role have been? Do you feel like it's been positive?

J: At first, I felt like it was a struggle, just because there were answers that I didn't know to get. Um, we actually as a ..a pretty large county, have over 24 secondary or high schools, and each of those schools has an assessment coach in the same position that I'm in

I: mhm

J: and um, we all have to deal with huge volumes of data, some of them bigger than others, obviously mine is one of the biggest. All the secondary schools have a huge role. So what we've done is we've developed something called uh, the assessment coach data base using microsoft access, are you familiar with that?

I: mhm, a little bit.

J: Ok, so it..it's not really all that easy for a lot of people to learn, and I have to admit, that last year, that was a struggle, so I was...I was trying to deal with that aspect and at first...it was...it was frustrating cuz it was the first time that I had a new role, that I didn't you know, excel really quickly, and so last year was really tough as I learned how to use the assessment coach data base and access, and how to use access, and now I feel much more comfortable with it.

I: mhm.

J: and so now I've lost my train of thought as to what your original question was.

I: Um, if ...if you eellike the involvement has been a positive experience

J: Yeah, yes I do. I also feel like um, in my new position, I have contact with students that I did not have contact with before.. So as a physics teacher, you know, all the students that took physics were taking it because ultimately they wanted to go to college

I: mhm

J: Now, the kids that I work with repeatedly are the kids who are barely passing a lot of their classes

I: mhm

J: and they struggle mightlily with taking their tests, and that's why I have to test some of them repeatedly, um, over the course of the year.

I: mhm

J: and, I have..like I said I have to give them some support materials and show them resources where they can study on their own, and encourage them, and meet with them, and so..it's been really different in that regard. And I like that I'm that difference to that different population, I'm glad I've had this part of my career.

I: mhm. How do you think that your leadership role has complemented your over all goals as an educator?

J: How do I think that my leadership goals .....

I: role

J: is that what you said? role..has complemented...I think it's kind of .....balanced it out, where I have...I've had multiple roles as an educator, you know, obviously we all start you know, as a student teacher, and then we get our own classroom and we're new teacher

and then we're experienced teachers and then I moved into that role of being the um, department chair, where I was...yo now, in charge of developing professional

development for my science department and um, holding meetings, and I had the fiscal responsibility of ordering all the science supplies and text books and things like that, and ..and I just feel like there's so many different aspects of education, that now I feel like I could move into ...if I were younger (laughs)...a um, a leadership role in the county even. Um, you know the science coordinator for the county or something like that, where you're going to make decisions that affect a lot more students,

I: mhm

J: you know, not just the students that you know in your school or that you have in your classroom, but um...affect maybe the curriculum for the entire county.

I: mhm. And you've...you've talked a little bit about how your leadership involvement progressed over your career. Do you feel that you've been more involved in things as you've been in education longer?

J: Oh absolutely, yes. You know, your confidence goes up as you gain more experience, and I think I've been fairly in tune with where I am and I know, and what I have the ability to lead and when it's time for me as a new person to just follow until I can get my feet under me. Like I said, last year, I ...I wasn't really comfortable in my role, and I'm not what I would call leadership ...in the position that I hold now, I wouldn't say that I could lead somebody new into the role. Um, but maybe within a year or two, I could ...once I have a little more mastery of access and I have a little bit more comfort with everything that I do that I could take a leadership role in that too.

I: mhm. And, how do you think, um, what factors do you feel have supported your development as a teacher leader?

J: hmm...I'm not really sure what you're looking for there, what kind of answers

I: well, you said that ...you started out feeling like, um, from what your mom said, you know, that you always had this leadership that's kind of ...a maybe a personal characteristic? Has there been anything throughout your career that's helped you feel more confident um, reaching out, sharing things, taking on extra roles...

J: I think what it is is when I .....when I've gotten that feedback from ...for many years it was the students that I was working with...that what I was doing was working, and it gave me the confidence to share what I was doing with those around me.

I: mhm

J: Um, I can remember one anecdote was um, common assessment became a really big deal there for a while in our school and we sat down, the 6 of us and we made up a midterm and a finale exam that would have a lot...mostly common questions, like 80 to 85% common, and then..after we administered it, we did some data analysis and we looked at things, and we found that...each of...we..well, we concluded that each of us as teachers seemed to have some things that we did better than the other teachers did, even though we did a lot of the same labs and felt like we did a lot of things the same,

I: mhm

J: and one glaring thing was this one teacher had performed really low in one area, and I had performed unusually high in that area. And he said to me 'what did you do?

I...I...every year, I struggle, you know, when I have this topic, to have my kids understand' ...and it was um, one of Newton's laws, and I said 'Well, I just take them out to the bleachers and I'.....it was that 2 masses would accelerate at the same rate?

I: mhm

J: So I said 'Well, I just take them out, and I take a really big mass and really small mass, and we go out to the bleachers and we drop em, and they all see those two masses even though they're much different, accelerate down side by side'

I: mhm

J: and you know becomes very vivid. So, my kids had like a 90% pass rate on those questions, and his were down in the 30s.

I: mhm

J: and what he had been doing is he had just been talking about it.

I: mmm

J: So talking about it and doing it were two different things. So after that, he started taking them out, and dropping the things side by side, and then huskies did just as well. And there other anecdotes, you know, where it was the reverse, where I was learning something... to do something better than an other teacher had done.

I: mhm

J: So we, you know...we..we share those things, but it's that confidence that what you're doing um, is working.

I: mhm. And have there been any specific factors or triggers that have motivated you to take on a new role or to do something in the realm of leadership?

J: ...I think it would probably be, just ..confidence..and those are..there are multiple sources for that, you know, my own confidence or confidence that I've gained as a result of conversations with students and...and teachers, and administrators and ..and co-workers, that you know, what you're doing needs to be shared

I: mhm

J: you know, your ideas are really unique and good, and I mean, that was one of the reasons I became department chair, was um, my...the science administrator said you know, I want you in this role. The things that you suggest are..are unique and nobody else has the kind of ideas that you have, and I think that the department could really benefit from your leadership,

I:mhm

J: so, you know, sometimes it just takes somebody giving you that nudge

I: mhm. What do you think, um..the MSSE ...your participation in the MSSE program, how do you think that impacted your ability to act as a more effective science teacher leader?

J: I think...it basically expanded my vision of my role, um because, I..I was formerly a mechanical engineer, and then a physics teacher, and I didn't have a lot of background when it came to what was going on in the biology department or the earth science department or the ..the chemist, with the chemistry teachers. You know I..I took a lot of those classes, but it had been ..pretty long time ago

I: mhm

J: and so they were just...they were foreign to me. But when I got involved in the MSSE program there were a lot of online discussion, and it wasn't just other high school teachers that were part of the classes, there were teachers in the middle school and there were teachers from around the ...the ...the country that had much different experiences than I had

I: mhm

J: um, you know, we were always amazed that the variety of...of resources and class six and um, uh number of preps that people had, you know, I mean I was in a big school and

..and there were people who said they had 5 different classes that they would have to teach (laughs)

I: mhm

J: I remember then thinking that my complaints about you know, oh, I have to teach all IB that that was petty compared to some of the things they struggled with. So that really opened my eyes.

I: mhm

J: That huge variety. And then, um, when I actually did the summer that I went out there, I took...um, what was it, like wild flowers of Montana, or Rocky Mountains, or whatever.

I: mhm

J: I took a course that was so different and it actually, you know, made me use a different part of my mind than ...than I typically did.

I: mhm. The flowering plants class?

J: So that..yeah, that experience with those teachers and then the experience being in Montana was very....really unique.

I: mhm. Do you feel like the program provided any uh, specific support in developing leadership skills?

J: To be honest, um, I don't think it did directly.

I: mhm

J: I think that indirectly, you know, what ends up happening for a lot of us, is by ..just the experiences that we have give us more confidence and then that confidence translates to um, being a natural position of leadership. Um, but I don't think there was anything that was direct.

I: mhm

J: You know, I never felt like oh, this is going to help me be a better leader. But I think a lot of it indirectly did.

I: mhm. Were there any specific courses or any experiences..that..that you felt were supporting your development as a leader?

J: Um, the one thing that I did was, I took the uh ...that safety class. I don't know if you're familiar with it, but the year that I was there, we had a really good safety class and um, I felt like that was the kind of thing that somebody who is a leader in a science department should..should take. Um, whether you're going to be using bunsen burners or not, you should know all the guidelines, you should know about chemical storage, you should be able as the department chair, be able to go in and look at all the science classrooms and there should be obvious things that you should want to fix if they are, you know, dangerous. And so that was an im..important class that I felt I was glad that I took.

I: mhm. And it was like a lab safety class?

J: Yes! And, I mean, we lit fires and he gave us some faulty fire extinguishers so that we would know what was go..going on when we...we used it improperly or the it was faulty, and then to see how powerful the ..the effect of what were those. That was something that a lot of us had never done

I: mhm

J: you know, even though fire extinguishers sit in all of our classrooms.

I: (laughs) Right! Yeah, I've never done anything like that.

J: Yeah, it was..it's something you should try.

I: yeah

J: Light a fire and try to put it out

I: Yeah, absolutely. How about the capstone? Did the capstone project support your development in any way?

J: Actually, yes. And, one of the things that um, really struck me was how ...how glad I was that I was able to have a topic that not only was ...I don't want to say easy, but it came natural to me, I had a natural curiosity about it, and I felt like what I did was very legitimate. I didn't feel like I had to, you know, massage it or really pull anything out of it. I felt like the..the results jumped out at me, and I saw other people really struggling and even at the last minute, like changing their capstone (laughing), I felt so sorry for them.

I: mhm

J: Um, so the capstone was ..was what I often think about when I do think about the program.

I: mhm

J: Um, I don't..I did the um, the effect of spacing reasoning on success in physics, and I tried to actually ...not teach, but stimulate students' natural spacing reasoning to help them be more successful at physics because physics is so spacial?

I: mhm

J: And it, yeah it was just phenomenally interesting to me and then easy to write about explore.

I: mhm

J: Yeah. And the kids were really willing participants, it was cool because I didn't just do it, but they're 11th and 12th graders, you can talk to them about it. I told them that I was

going to be doing this and of course we had to do the parent letters for permission and everything, and

I: mhm

J: They wanted to know the results as we were proceeding 'Well, how's it looking? And are you drawing any conclusions?'

I: laughs

J: and yeah, it was cool!

I: So you go to share that research experience with your students as well.

J: Exactly. Yeah.

I: Yeah. And, do you feel like you use any of that, um more of the data analysis or assessment in current role?

J: I do reflect on that from time to time. And it was the other day I was trying to find um, something that I had used, um was it about standard deviation or something that I had used, and I was ..just looking back on that and thinking about that kind of data how I...how I had presented my results. So, I ..I do some from time to time, but, for the most part, because our county is so big, and um, we do have kind of a set standard for how all of our graphs are suppose to look

I: mhm

J: it's pretty much set

I: mhm, sure

J: so we even do.. like we do automatic imports of all our data, we all do it the same, we use the same program, and so it allows um, our principals then to all sit down together at the end of the school year and reflect on how they're departments did and where each of

them struggled and..and then that's how they focus on what the school improvement should be,

I: mhm

J: you know, they' ll look at those results, and say 'Oh,well your algebra 1 ...you know, you have the same demographics I did, but your algebra 1 kids did much better than mine, so what are you doing' and then they find out 'Oh, well we're doing a math success program after school and we're...you know, this is the money that we...this is where we got the money for it and ..this is why it works and this is how we picked the teachers' and just so...like I described earlier with..amongst a small group of teachers, the same thing happens with the principals with our data.

I: mhm, within in the county?

J: Yes.

I: mhm. And, um..thinking about the MSSE program, um, if you'd think about where the program could improve, with the idea of always, you know, trying to improve, continuous improvement,

J: mhm

I: What do you think the program could do to further support the leadership development of their..of their teachers

J: Specifically just for the leadership development...

I: mhm

J: hmmm..Well, during the years, when you're, you know, just taking classes, they of course, they ask you to take a leadership role in guiding the discussion. So, maybe that's where the emphasis should be placed? But then, maybe to continue that concept once we get on to campus

I: mhm...more ..more discussion?

J: well, or just..you know we're all there for a certain amount of time, and every body's there different times, so we're not all there at the same time, but you know we had to be...like I had to be there for 2 weeks, and so, maybe during those two weeks, if I knew in advance that I was going to be in charge, and it didn't have to be educationally focused, you know it could be, you are going to have to plan where ...you're ...the people in your hall are going to go to dinner that night, or you know, you're in charge of setting up an activity or something.

I: mhm

J: I think there are people who probably don't realize that they've got leadership skills

I: mhm

J: unless they are given the opportunity. So maybe that be place you could do it?

I: mhm. Is there anything else you'd like to share about your own teaching situation or about the MSSE program?

J: I loved it and I've recommended it to any body who was interested in starting a program, so I was always glad that I did it.

I: mhm, and I think it must be interesting for you, coming from your background, with the engineering background, like you said, to take some of those different classes as well.

J: Oh, absolutely. Yeah, and it also allowed me...because...because I was an engineer, um, I didn't take all the same classes that all the other physics teachers did, because I didn't know I was going to become a physics teacher. So I had gaps that I had to do a lot of self study on and there were...topics that I was going to potentially teach in the future

I: mhm

J: and I was allowed to take, for instance, special and general relativity, and then after I did that at MSSE, then the next year, it was an option that I chose to teach with my IB seniors,

I: mhm

J: where I had chosen different options in the past because I didn't know anything...well, not ..I didn't know enough about general or special relativity.

I: mhm. So you were able to um, supplement your..your content knowledge through the science classes as well.

J: Exactly. Yeah.

I: Awesome. And do you think having a little bit more content knowledge also helped you share things with other staff, other science teachers?

J: Absolutely. I was say, to be honest, that the was the stronger part of the program because I felt like I had a very good um, I had a good education program to begin with,

I: mhm

J: that the ..the education classes weren't as useful to me as the classes that I was allowed to chose. And that were from my content area.

I: mhm. Awesome, well, I don't have any other questions for you. I really appreciate you taking the time to visit with me, and I know how busy you are right now with all of the testing going on. Um..what I will do is I will transcribe our conversation and e-mail it to you. And then, the only other thing I would need is a contact of someone that you work with, if there's um, an administrator, or I know you mentioned uh, somebody with like the student success person, someone that works with you just so I can have a short conversation with them as well.

J: OK.

APPENDIX J

MR. TOLLEFSON TRANSCRIPT

**APPENDIX J**

Interview with Todd

I: is it ok if I have the conversation recorded for the audio? T: Yes.

I: Ok, and then, what I'll do at the end is when I type this up, transcribe it, I will send you an e-mail just so that um, you can say, Yes, it looks..it looks correct and things are clear.

I: Um, so would you tell me just first a little bit about your school that you're in, how big of a school, how many science teachers, things like that?

T: Yeah. Um, we are a k-8 district, uh, on the West side of Missoula I: mhm

T: And so, at one time we were a little country school, but no longer. We're about 1400-1500 students now and about ...with three different buildings, um, uh with ...about 40% free and reduced lunch,

I: mhm

T: uh qualifications and then, in..in my middle school, we have uh, 3 teachers that are ..that are pretty much dedicated science teachers and then we'll have one or two teachers that pick up an extra class, so we're ..we're kind of getting to that size where ...where our teachers are no longer the 7th grade science teacher or the 8th grade science teacher, we'll have to have people pick up an extra class here or there.

I: mhm. And what are you currently teaching? T: I teach 7th grade general science.

I: mhm. And, um, as far as some of the leadership roles that you described, do you want to just explain what you do and what it all entails?

T: Yeah, so I have 25 of years of experience, and so I'm ...I'm the ...the old guy on the..the 7th grade, or the middle school science department, I guess..

I: mhm

T: We don't really have departments, but uh, but, the principal and the superintendent they recently did a Missoula county uh, school science curriculum revision. I was the one that represented the middle school at those meetings, and

I: mhm

T: Um, and I'm the...I'm the mentor for the..one of the new science teachers that came in

I: mhm

T: and, uh, so it was his first year, so I was mentor for him this year and I will be next year. And, um, I kind of guide Dave as another science teacher that came in new, and will be....will be guiding that person as well.

I: And is the mentoring something that's more formally assigned, or is it something you've taken on pretty informally?

T: Um, I..I would have taken it on informally, but there's also a formal position with a stipend ..a thousand dollar stipend.

I: mhm

T: Um, but it's..I only get that for the one ...for the one teacher, but I kind of stepped in and go over and check on the other teacher as well.

I: mhm. And with the stipend position, was that something you had formally apply to do, or were

...were you um, did you have a conversation with an administrator where they wanted to you to do it, or how did that look?

T: It was uh..the head of the mentor position, or the head mentor, when I did the ..the director of the mentoring, he requested that I apply

I: mhm

T: So, it was kind of that I was ..that I would be this person's mentor, just make sure that you apply, follow through the procedures I: mhm, mhm

T: So kind of an informal request, but also kind of through a formal channel, I suppose I: mhm

T: to make sure that ..

I: And then, um, is there anything where you're having to do any ..any providing professional development or anything like that?

T: Um, not in terms of..of full staff, but just kind of in small ..small session, like Loelle? will have a ...the science..there will be another new science teacher kind of coming in, and ..and the principals told ...told us that we could come in in the summer. He said you could come after July and..and we kind of go through the ..the curriculum, but also go through the science materials and purchasing and ...and where we keep things and they kind of ..so a little bit of professional development uh, for that person, but also to kind of help them with navigating the channels in the ...the middle school science kind of procedures that we do.

I: mhm.

T: Yeah, so it's uh, yeah a little bit of pr, but or..or..or professional development, but it's really kind of an informal just kind of a let's get in together and we'll talk and we'll just sit down and talk I: mhm

T: all night (laughs) ...I write up the agenda, I write up the list cuz it goes to the superintendent and the..the principal about the ..the..the items that will be on the agenda that we'll talk about I: mhm. Um, and with the different roles that you fill, what do you think your motivations for taking on the role or agreeing to do the ..fill the responsibility?

T: Part of it was the..this kind of realization that I was no longer the puppy any more (laughs). For a lot of my time, I was always the youngest person on the science department, and..and.. and even though I'd been teaching for over 15 years, I was still the young guy.

I: mhm

T: (Laughs) Uh, and then and the older people still had all those spots, so then they finally retired and then...it was kind of like where.. who..who do we look to? Where do we go? And then, well, there's Todd. He's been here the longest, and he's got his masters degree and so, ok, Todd, let's go.

I: mhm

T: And so part of it was this realization that..that I'm..I'm at that point in my career, I'm no longer...I'd have to ..so it's...part of it was this realization, well, somebody's got to do it. And..and I'm qualified. And me accepting that I'm qualified to do that, I have a degree, I've workshops, I've done these things...and so kind of like this recognition that it's time to play the big boy role, in a way, be more professional, have a more professional presence, and ..and uh, in the building and in the district.

I: mhm. And have you felt that the outcomes of this added involvement, have they been positive? Have they been negative?

T: um, no they've been really positive, um, I ..I ..part of recognizing and thinking about what we do and how we do it, and what we teach, and how we go about it is...it matches with...with NGSS and um, and the ..the philosophy that.. that I've kind of developed over time, it matches up, and it's..and so it's kind of this affirmation of yes you're doing ok

I: mhm

T: and, it's..it's, um..and to continue on that same path. And the principal seems to respect my opinion, and asking and..pretty much that I can give the...the ..to the individual county district shared their science curriculum and I looked at it and I said, well that's just..we do it a little bit differently

I: mhm

T: We...we..and just wanted to know, do we cover the same topics, and I said 'yes, we just do it at different times in middle school, not at the same time.' And he was like 'ok, just as long as we're covering it.'

I: mhm

T: And so it was this..this uh, recognition that we're doing it and then they'll trust my opinion on whether an..an assessment and thinking about how, how're we doing it, and are we doing it well?

I: mhm. Do you feel that these extra roles have helped to complement your overall goal as an educator?

T: Um, Yes. Um, it..you know, about 10..no about more..yeah, about 15 years ago I started getting requested for ..to be with student teachers and ..and then there was also ...we're a university town, the University of Montana campus ...are in town, but we would get a lot of pre-service teachers coming in and a lot of those teachers would come in, uh, so then,I would be in that role, as a mentor towards them as well, but over time, it's been slowly building that...that now it's not just to the pre-service, to the..to the college students, it's also to the...to the teachers on campus

I: mhm

T: Or the professors that we've hired, so it's kind of the slow growth and changing and adjusting to ..to something that..that..I don't think I want to be in an administrator position, but (to co-worker: yeah, yeah, sorry, another teacher popped his head in, laughs)

I: mhm

T: the..and so, moving in and kind of being in that and that transitioning into more of the head of the ...the head of the ...the imaginary kind of science department that we have.

I: mhm

I: And you kind of answered this, but I'll ask it and you can...you can expand on..um, how has your leadership involvement progressed over your career? Have you become more involved? T: Yeah, I..I don't.. I really haven't gone out of Missoula

I: mhm

T: Um, in terms of being ..being a presence in ..uh, but there was..but then in terms of the county and what happens and what we talk about in terms of middle school science and what' taught at...the scope and sequence um, i think that ..that's become more of a and kind of a stopping point for me. I really haven't had the desire to step in...into the kind of state leadership kind of position. But I think the opportunities are there.

I: mhm

T: if I wanted to, and you know, I think I've..I can, you know, I can back it up with..with the workings to the things that we could have done in the...previously, so, it could maybe later on...but...

I: And with, like the ...the mentoring and having student teachers come in, have you noticed a progression of that, where you're doing more of that now then you were as an early, novice teacher?

T: Yes. Yes, definitely. Um, And..and it seems that..I get... that..that the university people are coming to me, with..with people, saying 'we..we think that this would be a good fit for you. Can you take a student teacher?' It's not me saying I'm open to student teachers if there is anybody available, and it's more..there's more a request of ..of ..of university staff kind of saying 'could you take a student teacher, could you work with people'

I: mhm

T: so that's kind of a ...a ...a pat on the back, recognition that...that I'm doing as well, that I do well with that, those pre-service teachers coming up.

I: mhm, mhm. How has the MSSE program impacted any sort of um, progression in that involvement in leadership roles?

T: Um, you know, in terms of the MSSE, I'm not sure...it was ..it was a really great..it was a confidence builder that..that I had with science, and..and that had the background, but in terms of the pedagogy and teaching

I: mhm

T: and how to...I'm not sure that was really there. I: mhm

T: Um, I then, there was a..the one that really kind of helped me turn the corner a little bit was a class that John Graves taught through the Clarkfork? watershed education program, and it was called MPRES,

I: mhm

T: Which was Montana Regional ...uh, Partners in Science, I think it was. Um, and, and that one focused on um, it focused on the the NGSS and ..and the different practices and what does it mean to teach these in a class and how is that..how is class and how is the curriculum going to change when we focus more on the three ...three parts, the 3D kind of components of NGSS versus, the more traditional way, and so..

I: mhm

T: That's...that was a bigger piece of helping me adjust and move to see now I can ..I can ..I can talk curriculum, I can talk what a lesson should look like, and help...um, and so the MSSE didn't really focus on so much of that, about how to be that leader, lead teacher

I: mhm

T: and leading describing curriculum, um...but it was still John, so in some ways it still is MSSE...because John is, was the one who kind of guided that program, and so

I: mhm

T: um, kind of a back door to ...to MSSE, um, but I mean, I tried to focus on taking as much science as.. the science classes that were offered. I really enjoyed those and ..and that really got me through on my masters, I couldn't do a straight up curriculum and instruction

I: mhm

T: masters, it just..it just's not what I really wanted to do, not motivating for me at all, and not really where I want to go, where I want to put my...take my career

I: mhm

T: um, so that..that was great piece for me in helping me through, and um, I think...I'm not sure what the curriculum looks like now, but..what the program looks like now, but I think having a piece about focusing on the NGSS would be an important thing to..to include.

I: mhm. And I graduated from the program as well, and NGSS wasn't in ..to play at that time, so that..that's a good suggestion.

T: yeah.

I:What factors..oh, go ahead

T: Oh, it just seems ..it's a game changer now, I think. And I don't think a lot of teachers that are going through there really understand how ....how it's...you can look at it, you can find what you want in ..and say, yeah, we're..what we do is fine, and really you're not..it's not quite the same direction that ..that a teacher really wants schools to go,

I: mhm

T: um, and have...and, ...and have people understand it and understand what the 3D component of it is a big shift. I think having more teachers experience that and see that through a graduate program is going to be important.

I: mhm, mhm.

T: yeah, so I'm sorry, you said you graduated through MSSE too, and

I: Yeah, yeah I did, and it was before NGSS was even, you know, being rolled out, so T: yeah

I: That's a good suggestion, that they could incorporate that into their, maybe a class or something

T: Yeah, I ..um, ..and I don't think they would ...I'm not sure where it would fit, but there would seem to be a required thing ...looking at..through national science curriculum with ..that we have, and what it's ..what they've meant, what..how they've progressed, almost a history of science education component.

I: mhm.

T: Um, so...

I: yeah, that's an interesting thought. Um, when you think to your own development as a teacher leader, can you think of any factors that supported you development along the way? T: (Laughs) Um,the..the old..yeah, the old dog leaving, uh, and nobody else was there to do it, that was it, um and then that MPRES class, was..was..that was..that gave

me a solid understanding that ...and an appreciation of what I ..what we were doing was ok.

I: mhm

T: Um, kind of the.. the concepts builder, that ..that we can do it and walk in....talk about it and help other people understand.

I: mhm. And in what ways has your participation and completion of the MSSE program impacted your ability to act as an effective science teacher leader?

T: Um, you know...I think having the degree and the credentials is..is ..is a powerful piece too, that ..that when...that,you know, if I have somebody ...like, curriculum review, which ..which curriculum do we want to select, and having that degree and having that experience, we'll be able to look at that and say that, this is the direction that we want to go, this is how we want to take it

I: mhm

T: um, and um, and just in..being able to handle the mentoring of the students..the university students. Ok, this is ..this is what your lesson is, but how..where..how could you have tweaked it or how could you have re-ordered the prog..the progression of the lesson so that it..that in some cases, it's like following the 5 E's

I: or you know, having the careful lesson analysis and the..the discussion of the philosophy of how you put it..what you in and went, how did you imagine it before and what did you do to fix in some sort...to improve it

I: mhm. Did the MSSE program, um, provide and triggers or any specific experiences that supported your development as a teacher leader?

T: No, we didn't do um, I mean, we didn't do a lot of that kind of talk formally in class I:

mhm

T: about lessons and being um, in teaching and in curriculum selection, um..but, having this..this cohort of people that, you know, that.. time on campus with other teachers and ..and being with the..the people that are just like you, and've been..are going through the same thing you're...we have a lot of informal discussion, kind of you know, on the drive to Yellowstone, you're all in the van

I: (laughs) Yeah.

T: So it's ..so there's all that.. that informal time, especially on campus. And..and you know, it's Thursday night and you're going to ..to music on main, and then all of a sudden you're talking shop again, so..so while there wasn't a formal class,

I: mhm

T: that..that cohort of having people together I: mhm

T: was..was really powerful, and I still, you know, have 5 or 6 people that are, you know, Facebook friends and ..that you know, part of the cohort that I went through that are still ..still keep in touch, there's still contact and ..and we'll..there's a gal that I met that's in Jackson Hole, and we still and we still visit, we still talk school

I: mhm

T: and assessment stuff and all that, and so ..and that to me is just connecting people is important too.

I: mhm. How about the capstone project? Do you feel capstone, um, how do you feel the capstone project supported your development?

T: Oh, gosh. Um, you know, it...I look at..I look at science education articles a lot more carefully and a lot more deliberately now, than I used to. It used to be looking at the, you know, the science NSTA magazines and looking at those and ..and considering them in terms of what 's the idea..and is there any cool idea I can use in my classroom, and now I

look at them a little bit differently in terms of ...um, what their methodology was and what's the data, and um, how many people were a part of the process, and so it..I do..I think that it did help me look at uh, the educational ..the professional journals out there a lot more carefully, and the data out there, and um, an became interested in that a lot more. But in terms of ..being the teacher leader, um, I..I haven't..you know, I haven't done another kind of research project or anything in my classroom like that

I: mhm

T: um, just, kind of some informal stuff that I'll think about and consider, but not in terms of..of a ...more um, my own professional individual research, I really haven't done too much beyond that.

I: mhm. In the spirit of continuous improvement, what do you think the MSSE program could do to further support your leadership development?

T: Um, gosh...um, you know, when I was an undergrad, um, and becoming a teacher, there were ...in my methods class, the..the professor had teachers from the community coming in and talking about classroom management or cooperative learning or what..what they do in their classrooms, at the..at the undergrad level,

I: mhm

T: so we were kind of like this guest presenter, and um, and I think ... I think the universities could do a better job of ..of pulling in those kind of professional experts. They're not, you know...but they do some particular thing well in their classrooms, and coming in and being..being a part of a presentation, being a part of the class, and..and here's what it could look like..here's what you can do with it

I: mhm T: Um..

I: Almost like ....

T: It's almost like a guest lecture for a day but it's...but no..but you know, schools aren't willing to always let the teachers step..step out and or that they demand sub pay or something like that, and there'd be nice compensation for those teachers too in some ways, so having the universities like MS..like the MSSE..All right, here ..we're going to connect you to these teachers that proven, you know, master teachers, and they have their credential and they've demonstrated that the quality in these areas that they ...they present at the undergrad level too and then it's not just a..a it's not just, oh, you're the mentor teacher or student teacher level,

I: mhm

T: it's that you're...your'e coming in the university through the pocket at the methods level

also I: mhm

T: That's something that I'd like to see a little bit more..

I: mhm. Almost, um, like ..the skilled teacher modeling what they would in class?

Something like that?

T: Right. Yeah, yeah. And..and as an extension, there would be people at the university ...University of Montana, they go, oh yeah..that's a great a idea, and then I'll say it to somebody else, so ..oh,yeah..that'a great idea, and..but , so I think..I think there's you know, and also helping teachers stay connected through, you know, they ..they have these bonds through your cohort that you went through and you were doing the ..the same online classes, you were reading each other's comments, and ..continuing to foster that ..that the relationships, and so..so they get uh, so there's the professional connections that are maintained

I: mhm

T: through MSSES..MSSE could be that conduit that would ..that would help keep them together.

I: mhm. Yeah, very good. That's a good thought. Is there anything else about your experience with the MSSE program or your experience as a science teacher that you would share?

T: Um, I ..I'd have to say I'm not sure who to specifically to thank, maybe it's John Graves, maybe it's Peggy, but ..but I would've never have gotten the masters degree without that program. It..it fit my needs perfectly, it fit what I wanted perfectly, um, and ..and got me through, and so I have to express a great gratitude to whoever designed the program and put it into play and keeps it going. And from what I see, it..it continues to grow, there are.. there are like a diversity of students in the people that are up in the picture that they post and share

I: mhm

T: bigger and bigger and bigger, and..and you know, it's teachers from around the world that..that you're ..you're riding in the van with somebody that's teaching in Malaysia. And, so it..I think ..that ..it's a cool program and I appreciate it.

I: It is, very cool. Well, thank you so much. I really appreciate you taking the time to visit me, especially with it being such a busy week for you.

APPENDIX K

MR. DIRKSEN TRANSCRIPT

**APPENDIX K**

Mr. Dirksen

I: Um, is it ok that I tape record the interview just for clarity?

D: Absolutely

I: Awesome.

I: Well, I 'm going to have just start by ..by setting a little bit of a context...tell me a little bit about your school and your position.

D: Ok, and so I'm uh..at Hoover Elementary at Yakima, Washington. Um, it's a k-5 building, we have about 650 students, with a pretty high..um Hispanic population. I think we're ..um..60-70% Hispanic, with about half of our building being English language learners

I:mhm

D: Um, also..a very high poverty rate, I don't have the specific numbers because they've gone free and reduced lunch, our district has gone just 100% free and reduced lunch, um a couple years ago, I know it was over 80% free and reduced lunch, and so high...high Hispanic rate, high ..um, poverty rate as well. Um, my current position, second year I've been here, um, I'm an instructional facilitator

I:mhm

D:and instructional coach, and so I...am kind of...kind of a liason between administration both district and building and teacher with um...in help with assessments, data analysis, best teaching practices,um, you know..I can go and model lessons for teachers, observe them, kind of give pointers, set goals..and..and work on best teaching practices, and for that, um..and so, I that's a nut shell...does that make sense? (laughs)

I: Yeah, yeah that does.

I: So, um, just ball park, how many teachers do you think you have on staff in your building? D: right around 30

I: ok

D: And then we have about another 15-16 paraprofessionals I: ok

D: as well

I: And you mentioned a little bit about your positions being as the instructional coach, D: yes

I: And, you know, how would you describe that or any other things that you do with in the school as fitting into a..a leadership role.

D: Um, it' s...so I..um, on Monday afternoons we..the students get released an hour early and so we have professional development time. And so, um, twice a monty typically, we have what call district directed days, where you know, the district can kind of take over that hour, but in ..in that time um, you know, I'm giving professional development any where from math strategies and reading strategies and content to data analysis, and so I'm..I'm leading the..the staff through different professional developments, um..at whatever the need is at the time. Um, then, weekly, each one of our grade level teams has...um, have grade level meetings, team meetings and I ..I don't run those, but I definitely go in ..um..to help answer questions and help kind of disseminate any information from the district level to them and..um and so, like this afternoon, I have a..um, a district meeting that I go to every Friday afternoon, which is so enjoyable..(laughs)

I: (laughs)

D: Because in Yakima there's 14 elementary schools I: mhm

D: So we're a fairly large district, and so each building has at least 1 person like me, um, and so we all get together, um, and have information given to us that we then get to..to ..to bring back and share, and so it's kind of taking..ok, so the district say they need this and trying to make it work for our building. Ok, how does it work for our teachers, how can we..um..do what's best for our kids in that context.

I: mhm...mhm...And are you ...are you the only person within your role in your building?

D: Yes. Yes. And so, I 'm k-5, primarily reading and math, but then it's what ever else ..other duties as assigned kind of thing (laughs)

I: mhm

D: to ..to help with, um, instructionally...like, this past week, I went to a second grade class room, and we were..I was doing a..a narrative write with the students, and modeling that for the teacher and just going in and having fun with the writing process with the kids.

I: mhm.

D: Um, yeah. And I do different language acquisition activities or ..or you know, whatever..whatever, you know, I need to model or can model and give ..give teachers a call and 'Hey, can I try this in your class?' and ..and give them..you know..try out different strategies.

I:right. And when..when you provide uh, professional development, is it usually your entire building, or is that more in a grade level situation or how does that work?

D: Um, usually, like on the Monday afternoons, it's..it's the whole building, k-5, um..which gets kind of tough sometimes. Um, I taught mostly 5th (or 6th -can't tell) grade, um, but..and so it's kind of a stretch to think kindergarten, 1st grade a little bit.

I: mhm

D: But, on..on Mondays we definitely do ..do the whole staff. If there's more specific grade level things then I'll um..ask the team to put me on the agenda to come in and ..and discuss...discuss it at ..just with the grade level team just so it's better use of time and energy.

I: mhm. And then you mentioned that there's a little bit of an assessment component to your position as well?

D: Right. Um, and so, just looking at I mean, we have assessments going on constantly it seems, and so just..just looking at uh..data and trends and kind of starting to have the conversations with teachers of ..of student movement, because we have a walk to read model, so reading instruction is um, is by instructional groupings

I: mhm

D: And so, um...you know, if, Ok we have these kids, you know..where do they need..where do they belong. What's the most appropriate group for them, is there movement? You know, do they need to change classes or, you know, stay where they are, and help ..help teachers analyze and look at uh the data for ..for reading and math and writing...and just across the board.

I: And I'm noticing..is there a pretty strong focus on reading and math and does science take a little bit of a back seat?

D: Uh, science is a ..is very back seat unfortunately. It's kind of frustrating..on that. In the schedule, we..like last and this year, they only allotted 30 minutes a day for science

I: mhm

D: and if you've ever tried to teach elementary science in 30 minutes, you can barely, you know..get anything set up, let alone get anything accomplished, and so..um,

science..science is definitely on the back seat, um. You know, we're..the district's number one goal is to try and

get students to read I: mhm

D: and..um, and it's primarily through a phonics based program..is the direction the district has. One of the district level administrators ...it was a few years ago..he ..he said something to the affect of 'kids don't drop out of high school because they don't know how to do science'

I:right

D: And, and so..that's why we need to focus so much on reading is because..science isn't ..you know, the reason they drop out. And you know, which in a way, makes sense but then also the point..Well, but science might be the hook that gets them. (both laugh)

I: Right!

D: But, it..it's ..it's really frustrating and tough to get ..get much science um accomplished and done. And there's some teachers that are, you know, they really want to ..they really try, but..um, when our schedule is really packed with ..with different interventions, cuz, uh, we..we've got ....probably about a 40% of our students are um, intenteve ? readers, and so we have...have a heavy intervention program

I: mhm

D: to try and, you know, increase the scores. And, and so that really takes a hit um, on science. Uh, next year, we're kind of stream lining it a little bit, and so I think the..they're going to have the hour back for science

I: mhm

D: which will be..be a huge ..huge benefit to um, to the classes and to the students I think

I: Right. Um..With your position that you're in now, and any other sort of leadership things that you do

D: mhm

I: How did you come into the role? Was it something you had to formally ..um you were formally assigned, or you had to apply for the position?

D: Right. So..um, I finished MSSE program 3 years ago I: mhm

D: I think if I'm counting correctly, um..and um..and then that following school year, my position was ..was vacant in my building. We didn't have..have a person here, and at the beginning of the school year, you know, my principal..'Oh,hey Mike, you should..should think about taking it'

..and I was like, aw no, I want to be in the classroom. And so slowly through that year, I kind of helped my principal do some of the ..the extra work because it's a you know, a pretty big task to

..try and juggle both being principal and ..and this job. And so slowly through the year I..um, kind of ..you know, I was just helping out. I'd go to some of the Friday afternoon meetings, I'd do..you know, some of ..some of the running of ..uh, reports on ..on..on assessment or what not. And then I actually did go through an official interview process with the district..district level team to then finally accept this position.

I:mhm. Your..your principal started it with this conversation that he thought you'd be a good fit for that role?

D: Yeah. And she was like "hey..you know, you" ...because one of the requirements is having your masters'..and so 'hey, you just got your masters, you'd be great'. ..cuz I've been in this being for 16 years

I: mhm

D: now, and so it's like, hey you know the staff, staff knows you, you can ..you can, you know..you'd be great. And so, it kind of put the sniggle in my head, you know

I: mhm

D: I'm going..oh..you know, and then..then when I started doing it, it was, um.you know, kind of a fun different change of pace a little bit

I:mhm

D: um, for that, so then I went ahead and ...and put my name into the hat for it.

I: And, what do you think, um...I think it's kind of nice you had like, almost a trial run where you could see what it would look like,

D: right, yeah

I:Um, what do you think your motivation was for deciding, ok I'm going to go for it? D:

Um, it was a couple things. One, I needed something different

I: mhm

D: because at that point I did 13 years in an elementary classroom, 11 of which was, um, 5th grade, um..and so it was kind just like, I need something different, you know, kind of change of pace

I: mhm

D: sort of thing, um and then also, there was uh..one year, I think it was the 2011-2012, it was right in my..in the middle of my..um, MSSE program. I got to..we..we're..we tried something out of the box, and ..and I got to teach science, 5th grade science all day long. We had kind of set up a..a middle school schedule for our 5th graders so they rotated um, between reading, math, science, and social studies

I:mhm

D: through out the day, and I got to teach science all day long, and I was like, I mean, it ...it was awesome. But then, our reading scores kind of went down,

I: mhm

D: our math scores and our science scores went up, but our reading scores took a big hit, and so ..um, the district..the district and principal said, you can't do it any more. You gotta go back to teaching general ed.

I: Oh man

D: And elementary is just trying to juggle all of the subjects I: mhm

D: and you know, that was right at the time Common Core was really starting, you know ..it was right on the edge in trying to ...you know, juggle all that, it was really..

overwhelmed, it's like, well..you know, the reading program I'd been teaching for ten years, and so I was just kind of making that up on the fly, because I could

I: mhm

D: but it wasn't the best instruction, and it was just,you know..it was ...it was pretty overwhelming. So I was like, I need a change of pace, I need something different, you know, and ..and it felt like a pretty good fit to uh, step into ...to this position in this building.

I: mhm. And what have the outcomes been for you, moving into that...that new role?

D: Um, I've..I've gotten thicker skin (both laugh) is one of them. Um, you know, just really um, um..you know standing up in front of a group of your peers and giving professional development is not easy, especially when it's not necessarily warmly received.

I: mhm

D: and so, um really challenging myself to put together a presentation that's tight and concise and, you know.. to the point and um, and make it meaningful for the teachers.

I: mhm

D: And, so that's been a ..a huge, um...huge outcome. You know, and also kind of seeing..seeing the other side of the coin a little bit, even though I...it's..I'm ...I'm technically a teacher, I'm not an administrator, and I do get to at least get to see the administrative side of things

I: mhm

D: and ..and kind of knowing where some of the bigger decisions are coming from, um..for better or worse on that, but...but kind of getting to see ..see the other side of the coin a little bit, um has been another big out come for me.

I: And, do you feel like your involvement has been positive?

D: I think so. We've..we've, um, we've really..uh, kind of come a long way. Last year with the beginning of common core standards, um..the district adopted a new reading program. And then also, kind of..not officially adopted, but we implemented a new math program as well. And so, uh, a lot of the..the PD and work I've done is just kind of trying to figure out ..ok, what are we teaching, what do we need to teach, how do we, you know, how do we get through..through all that? And I think I've really ..I've....I've helped quite a few teachers navigate both of these curriculums

I: mhm

D: um, in a very positive way, just trying to make sense out of it. Um, and so it's..I think overall it's been..it's been very positive.

I:mhm. And how do you think moving into this position complements any sort of overall um, overall career goals?

D: Um, well , it was...it was..I guess in way, kind of trying to see what it..you know, what's life like outside the classroom

I: mhm

D: UM, you know, not necessarily thinking administration I: right

D: and ..just kind of...just you know, what else is ...you know, I've been ...I've been in the classroom for 15 years, or 14 years now or whatever it was, and ...and the ...let's, you know, is this ..kind of a logical next step in a way

I: mhm

D: since I've..you know, I've been in the building for such a long time and the position was open, it kind of felt like, um a natural fit for that. Um, and actually, I don't ...I don't think I've..I've said this yet, but I'm...this is ..this will be my last year in this position, I actually accepted a middle school science position

I: mhm

D: and so, um, and so next year I'm going to actually be moving up to teach 8th grade and 6th grade science.

I: And you'll back in the classroom?

D: So I'll be back in the classroom, um but teaching all science, is one ..of the positions that came open ..it's actually in the same building my wife works at, so we know a lot of the teachers

I: mh

D: and, it was like..it was too good to pass up. You know, even ..you know, I've enjoyed this position here, but you know, I miss being with the kids and ..and having that direct impact on the students and getting to teach science full time, it's like, I can't pass this up, this will be really good

I: mhm, So

D: And so, I'm...I'm changing schools next year.

I: So one of your..is it safe to say, just for clarification that, um..while you were in this building, this was kind of a natural progression, but..one of your overall goals was...you really liked be able to teach science?

D: Absolutely. And..I mean...I...the joy of my day was getting to teach science and really developing that, and when the district started kind of cutting back on the science, and you know, I firmly believe science and social studies is where you can really bring everything together,

I:mhm

D: and..you know, include the writing, the reading, math, history..I mean, it all comes together, and um, it's really frustrating at the elementary level to it get..get cut and you know, put you know ..essentially, on the back burner where it's ..it's not a priority at all. And I'm going, wow, we're really missing the boat here because, you know, kids get so excited when it's science time

I: mhm

D: and, you know, they ...one of the science units I've taught a lot is ecosystems. It's where..I don't know if you've seen them, but there's like..you ..you take the ...two liter pop bottles and you have an aquarium and get the soil and all that. And I remember, you know, we get..get our fish put into their aquarium...so they..they have fish that they've you know, you know caught, and then put into their aquariums and then they're reading a fairly high level text about their fish, and they're starting to look at characteristics..'Oh, mine's ...mine's a male fish because of this, this, and this.' or 'mine's female" and you know

I: mhm

D: and starting to have those discussions, that if we were just reading out of a book, they ..they wouldn't have been engaged at all.

I: mhm

D: but because they had the fish right there in front of them, they were totally...totally into it and making the connections and having that experience. And ..and so..so it's kind of...one of the reasons, you know, I'm really kind of switching is just ..I realize philosophically I'm not on the same page as the district

I: mhm

D: with..with teaching instruction and style and being in my current position, there's not a lot I can do about it

I: mhm

D: you know, it's..I'm...I'm the messenger, I can try and try and help teachers, you know, do

...do the best for their students, but my hands are really..really pretty tied, and that's a little frustrating, and so I'm looking forward to getting back back to the classroom and the students, and, you know being able to, you know, give the district what they need, but then really do what I feel is best for the students

I: mhm. It sounds like a good opportunity.

D: Yeah, and..yeah, I mean, and middle school science positions don't come open very often, (both laugh)..I think this is like one of the first ones that's come open in probably the last ten years, and...and so, uh, it was definitely too good to pass up.

I: mhm, Um, and you've mentioned your years of experience in your current district. D:

mhm

I: If you think over that span of time, do you think your involvement in leadership has progressed?..over the extent of your career?

D: Oh, I think so. And I..and I think that's just primarily, you know, time in the building. Um, I think out of the 30..about 30 teachers, there's only ..I can only count 4 that have been in this building longer than I have, and so that longevity piece, um, really promotes itself to ..to a leadership role I think

I: mhm

D: because...I have..I have years here, you know..I ..i have time in the building and ..and I think that goes a long way. Um, with especially new teachers coming in, and whatnot. And so I ..so yeah, I think that is a..a logical progression

I: mhm

D: with the time..

I: mhm.. How do you think, um, the ..your involvement in the MSSE program impacted your progression as a leader?

D: Before I started the MSSE program I ..I would vocally say that I hate school. I love being a teacher, but I hate being a student going to school because of always just kind of, you know, jumping through hoops, very kind of um, very not engaging

I: mhm

D: um, and ...and the MSSE program, and also...through high school, I mean, I think my grade point average was a 3 point O, you know, I mean I did ok, but it wasn't top 10 percent, wasn't you know, honor roll, wasn't you know, um, honors classes or anything like that. I just kind of you know, went through and um and when I did my undergrad, you know, it was like 3.2ish or some...you know, I did well,

I:mhm

D: but it, you know, didn't have to work that hard I: mhm

D: to do ok and, you know, I wasn't really challenged, and ...with the MSSE program, it..it challenged me, I mean I had to work really hard at it

I:mhm

D: but I wanted to cuz it was engaging and I ..I was into it and um, and it really did give me the confidence of 'Hey, yeah you can do this, you can ..you can work hard and be a good student, and you know, it really gave me the confidence in academia, you know, of ..'Ok, you can do this' I:mhm

D: it's...it is..it is possible and so, it did really give me that confidence. And then also, just ...the questioning strategies, you know, um, cuz I spent ..uh, two summers in Bozeman

I:mhm

D: and uh, as I was reading the IRB today, I was like 'Oh, we could get together, you know, do a face to face interview', I was like, 'oh, that'd be kind of fun, I wish we got together in Bozeman.

I: laughs

D: but anyways, I don't think that would work, but um..um...but as we were doing the field courses, just the ..the questioning strategies that the professors were using and the process, ok..you know, and..and really letting us kind of explore ideas...They'd kind of, you know, toss an idea out there, or maybe, you know...you know point our, you know, our observations and in a general direction and kind of just let us go with it. It really, you know, helped give me confidence of ..ok, I do..you know, I can think scientifically, I can think analytically, I can you know..be given parts of the puzzle, get the rest of the puzzle and put it together kind of a thing. And so, so it really did um, boost my confidence as a..as a teacher and student.

I: mhm

D: Um, through the program.

I: And with you modeling lessons, do you ever feel yourself, in your instructional coach role, pulling back on things that you saw professors use through the program?

D: Absolutely. Like, my ..my questioning strategies and when students are..are trying to explain..you know, explain something, I definitely, know you, kind of have those voices in my head of ..of... you know, trying to pull out a list of, you know, their..their thought process a little bit more, for sure. I ...definitely, uh..you know, I definitely feel that um, ..do you know Terel Adderson?

I: I'm not sure

D: Ok, he..um, he was one..he was a ..professor for one class, but a TA in quite a few of my ecology classes and he has a really, um...engaging way of asking questions and getting you involved, so I was..you know, I constantly just kind of had his voice in the back of my head,

I: mhm

D: you know, when I'm asking questions and..and.. and trying to, you know, solicit those, you know...not just give the kids the answer because what good would that do, you know, but trying kind of ...leading them to ..to discover it on their own.

I: Right.

I: Out side of the program, and it there are other things within the program, you can mention them as well, but do you have any other factors you can think of throughout your career that supported your development as a teacher leader?

D: Um...I'm not. I..I can't think of anything right of, just ...you know, besides kind of, you know..I'm somewhat extroverted

I: mhm

D: in liking to you know,...you know..and also, you know, I want to do what's best for the kids and when.. when I see something good going on, I want to share it, I want to, you know, yell it from the mountain tops kind of thing, and so..um, I think just kind of the personal desire and drive

I: mhm

D: to go through that, you know, and then also some encouragement from different administrators over the years to...to...to do that, um, as well.

I: mhm

D: So, I can't think of anything else beyond that (laughs)

I: mhm. DO think there have been any specific factors or triggers that have propelled you into roles of leadership? Or leadership activity?

D: Um..I think it's more of kind of on a need basis, you know I: mhm

D: when there...there's a void and ..and..and someones' 'Hey can you ...can you help us out with that?' You know..'can you go to this training and bring it back to us' or 'Can you ...you know..present this' or something where there's ..you know where there's a need there and being asked, and having the capacity to do that, um, you know is..is probably the ..the biggest factor, you know, putting..putting me into a leadership role.

I: mhm. And you ..with that need basis, you feel pretty confident saying 'Sure, I can do it.'?

D: Um, most of the time. Depending on, you know..you know..what ..what the subject matter is at the time, you know, what...what's going on, you know else even in the classroom or personal life. You know, and having the ability to do it at that time, but

usually, you know, ..if somebody..if my principals said 'Hey, I need you to do this' um, I usually, you know, I take that as a compliment,

I: mhm

D: you know, in a lot of ways, and then too, wanting to ..to then help..help fill that need.

You know, and then also trying to get the best instruction out there for students and help the teachers, you know, help my colleagues, um, you know..have a better experience in their classroom as well.

I: Right, mhm. Um..how do you think your participation in the MSSE program impacted your ability to act as a more effective science teacher leader?

D: It..it really..I mean, the confidence, I mean, part of it was the content I: mhm

D: You know, um, although, I've forgotten most of the stuff I did on the online classes, um, but

..but it...you know, the experiences in the field and you know...you know, looking at something and..and you know, whatever it is.. and ok, there.. there needs to be...there's an explanation for this. Why is this..you know...section of the mountain different than the section right next to it?

You know, let's ...let's think about the possibilities and then start mechanically thinking, ok, it could be this, this, or this. You know, do we know.. you know, do we know any of the history about this area, you know, and the ...pulling in all of those different factors and..and so, just that questioning strategy, and ..and, you know, being open to the idea, OK, I might not actually know the answer, but we can at least think about it

I: mhm

D: and present some questions. Um, to try and further our...our understanding I: mhm.

I: Do you feel like any part of the program helped you develop leadership skills?

D: Um, ...not directly. I ...I mean...I don't ...I'm not sure if ..if there's any..there wasn't any one point

I:mhm

D: Um, you know, I think. It was just kind of the...a lot of the little different pieces, um, and experiences um, that...that put together..uh, for that um, you know, and just building the confidence over the ..you know, the ...the two and a half years or so that I was in the program, of ..of you know, being able to, you know, learn something, and then be able to talk with authority

I: mhm

D: about that topic..topic or subject or whatnot, Um, was really was the biggest factor of, um for me.

I: mhm, So ...just to clarify..maybe, having that content knowledge and being able to think about it scientifically and feeling confident in how you'd share that?

D: Absolutely. And ..and a lot of that came from...from the field courses I: mhm

D: in Bozeman. Uh, cuz like I said, like.. cuz, the summer I started, I did...I took like 3 online classes

I: mhm

D: which were kind of, you know, fun and engaging, but like I said, I've ..I've forgotten most of what I've learned through..you know, through that..um, but, those experiences that we had, you know, driving around the greater Yellowstone area really solidified, you know, I mean..building that confidence and ,and seeing the areas, and having those conversations with ..with the uh, the professors and experts you know, in their field, um..really, really built that confidence over the next..over those 2 summers

I: mhm

I: And, what about..um, the capstone project? Do you feel like the project supported your development in any way?

D: Yeah, I think so because it..you know, it ..having to develop the ..the research question, that action research, and then, I mean..diving into that..the research, and looking for it and searching for it, and then..you know, kind of disseminating that, um..I mean that was by far the biggest research project I've ever done, um...and, um..and being able to go through that process and you know, unfortunately, I haven't had the..the time to ..to do that again (laughs). I've wanted to..and like 'Oh, I'd really like to do another' you know 'research' you know, uh 'study' or, you know, on ..on a given topic, but um, it was definitely..I just blanked out on what I was going to say...Uh, you know, but ..it definitely built the confidence that ok, yes I can do this, um, you know, it's challenging, but it is possible, and we can do it. And so, trying to..you know..look at things analytically, and ..um, you know, going through a process of ..of research and...and collecting data and then analyzing all the pieces to um..you know..for an outcome.

You know..

I:mhm

D: Definitely, did help.

I: mhm. Do you feel like you use any of those skills with your ..with your current instructional coaching position?

D: Not as much as I'd like.

I: It's not quite as data driven? With your role? D: um, actually...Well, it's data driven in way.. I: mhm

D: but ..but the way the district analyzes it..the ..the data is ..is really kind of weird. I: mhm

D: And..and it ..it's kind of frustrating. I, um, you know, was trying to..we have.. one of our main reading assessments in the elementary is called DIVALS-it's a diagnostic indicator ..I can't remember of..the rest of it what it stands for, but it's out of the university of Oregon

I: mhm

D: and...um, it..it basically is charting reading fluency. Um, and ..you know...the district..like..you know..it..it classifies kids that are intensive, way below standard, strategic, which are just below standard, and then bench-mark students, who are..you know, are at or above um, the standard that they ..you know..uh, have set to be...Ok, to be a successful reader in the future

I: mhm

D: and..um, you know, the district just looks at Ok, how many intensive kids do we have, how many strategic, how many bench-mark kids? And that's like the only level

I: mmm

D: where ...you know..where it's like, ok, but we're not talking about growth. I: mhm

D: Like, you know, I...I've um,was looking with some teachers, because, you know, they came back..they're..they're teaching most intensive students, you know, and they ..they had kids that were reading less than 10 words a minute at the beginning of the school year, now they're reading 60 words a minute, but the goal was 85

I: mm

D: so they're still intensive. So the district's like, Oh, that student's still intensive. I: right

D: but..they...but they grew, you know..there's...there's growth here, you know I: mhm

D: But, and...and so they don't really look at a growth model, of, Ok, how much has the students learned, it's just ..have hit bench mark or not,

I: mhm

D: kind of a thing. And so, um, so it's really kind of frustrating. Fortunately, on the..the website that we have all the data on, they did have a..a growth, you know, how much did students grow, and kind of put out a, you know, a growth percentile. I'm not sure how accurate or ..or how it was formulated or anything, but at least I was able to show some teachers, 'hey, this kid is in the 90th percentile of growth.'

I: mhm

D: He's still intensive, but he grew. You know, it's just trying, you know, to take a, you know..take a more realistic look at..you know...how...how their teaching was. And so, um..we're..you know, we're data driven in a way, but ..but I'm not sure if it's healthy because it's..it's more of just a pass/fail data driven

I:mhm

D: um, instead of 'Ok, how far have the kids come?'

I: right. And so because of, and you..you did already allude to the idea that, the philosophy of your district doesn't always mesh with ...with where you're coming from, so D: right

I: Yeah, I could see that.

D: And..and so then we're really going..there's..there's more to the numbers than just 'you have so many intensive and so many, you know, bench mark kids.' It's..there's more to it than that, but that's really all that look at

I: mhm

D: you know, and ..and I think that's kind of in schools everywhere. Well, how many kids passed the state test? Well, ok, but you didn't look where they started from.

I: mh

D: You know? Last year, this kid was..was monolingual Spanish, and now, he scored a level two, on the state test.

I: mhm

D: that should be a huge success I: mhm

D: you know, but ..it it's just, oh, they didn't pass. I'm like, oh..c'mon! (laughs) I: right.

D: You know, so..so in a way the ...the research, the action research project made it more frustrating

I:(laughs)

D: (laughs) because, it..you know, I learned at least a little bit how to do some data analysis and statistics, um or at least, knowing that there's a process out there for that, and ..and watching us not do that, I mean, cuz we have ..you know, thousands of students district wide, that we could, I: mhm

D: you know, be looking at data with...Which is, you know, it's a good sample size. But, we're not really putting it through a statistical analysis. It's just very surface level

I: mhm

D: and it..it gets really frustrating at that. (both laugh) I: I could see that.

D: There's a better way, it says more than this, you know? I: mhm

D: And you, and..and that's not the conversation. I: right.

D: it's just..it's just, oh..hey..this .you know, this school has so many percent passing, good job. I: (laughs)

D: Um, ok. (laughs). You know, um, and then been my big thing for years, even before MSSE, it's like, we've gotta look at the starting line, you know?

I: mhm

D: not just the end line, but that's a bigger problem. I: Right, right.

I: Um, in ..in looking at the idea of..uh.. continuous improvement with the MSSE program, D: uhuh

I: What do you think the program could do to further support your development as you progressed through the program?

D: I am ..I'm not sure. There's nothing ..there's nothing that sticks out..glaring, I:mhm

D: I know since I graduated, they've..um,I have a friend who I took some classes with, she's graduating this summer...um, you know they've added a..statistical analysis class that you have to take

I: mmm, mhm

D: um, and it..and so, I think that's a really good step, forward on that. Um, I can't really think of anything. I...I had such a great experience with...with the program for, you know, developing

teaching leadership, I mean science content..you know across the board..that..the ..I can't..there wasn't anything or that I remember going, oh they really need this.

I: mhm

D: they really need that, you know..I ...I can't think of anything..Um for that, I think the one thing, you know, the statistics class..making that a requirement, um is a..is probably the only thing I could think of that um, that would have improved since my program.

And, they've already added it.

I: mhm. I don't think they had that when I was in the program either.

D: Yeah, it was an option, you know, it was one of the menu items that you could...you could pick, and then they..I'm not sure where they inserted it into the sequence, but it is..it is now. From my understanding, it is part of the process.

I: mhm. one of the required

D: yeah, one of the required ed classes or something like that.

I: mhm. Do you have anything else you'd like to share? Or anything else to add

D: I can't think of anything. Um, yeah. It was one of those things where, you know um..my wife and I were talking about, you know, getting a next degree and whatnot, I you know..I kind of stumbled upon it once, the program, and then..uh, had a friend of a friend who went through the program and so, we got that recommendation, so I went back and did some further research and I'm so glad I did..you know, cuz, it's just..it was a fabulous experience, and um, and I tell every body who's looking to do a masters', hey, you gotta do this one!

I: mhm

D: So, um yeah, it was an awesome experience, and it really helped boost my confidence um, you know, throughout both teaching and personal life as well.

I: mhm. Well, I appreciate so much..you taking the time to visit with me. Um, D: my pleasure

I: I will transcribe the conversation and just to ensure that I've heard things right, I'll send a copy of it to you. So if you see anything that's like ..oh, no, I think..I think she misheard..just send me an e-mail back, so that it reflects what you said

D: ok. Alrighty!

APPENDIX L

MR. MARSHALL TRANSCRIPT

**APPENDIX L**

Mr. Marshall

M: Do whatever you like.

I: Ok, and so I will have you on voice .....record. Um, why don't you start by just explaining about your school context, how many students you have, things like that.

M: How many students at the school or just my students?

I: Um, let's go..... larger scale first, how...kind of the school context and then we'll look at what you do in the school.

M: Ok, so it's about 1500 students ....and ..um, maybe 60, 70 teachers. Um, we have a mix..... I want to say maybe, uh... 70% of the students are from the neighborhood and then maybe another 30% from outside the neighborhood, either uh, being bused in to the ...the uh, VEEP program, Voluntary Ethnic Enrollment whatever

I: mhm

M: um, or from just, you know, other neighborhoods where the um, parents feel that um, they're not happy with the neighborhood school.

I: mhm

Um, the um....probably about 25 to 30% Hispanic..um, maybe even, well, yeah, about like that.

I: mhm

M: Uh, We have I'd say a substantial number of um...people that...that are like visiting students, say, you know, like where...where the parents, because of the university being close to us, the parents have jobs uh, that have brought them to the UCSD, so they may be here for maybe a year or two. Um, we have quite a variety pack of um people just various countries, I guess,

I: mhm

M: that are pretty common for us to have in the school.

Um, we have pretty....uh, wide programs for you know, lots of different disciplines, very rich in sciences, science programs. We have a um, really good um, performing arts program, language arts you know. We have a lot of different stuff going on, an athletics program.... What else would you like to know?

I: OK, and then as far as what you teach, are you still teaching environmental science and physics or have you switched that at all?

M: Well, the physics is wrong. That should say chemistry in your notes.

I: mhm

M: I haven't taught physics here, um, but um, yeah so this year I'm not teaching... I was not teaching environmental science this year. I'll be teaching it again next year. Um, this year, I have only chemistry.

I: ok

M: Um, ...and um, this year, I reduced my work schedule to only a 60% schedule

I: mhm

M: following a surgery last year, and uh, I'm really glad I reduced my schedule.

I: mhm

M: I would like the money, but uh, time is more important.

I: Yeah. ....Then as far as um, filling in different leadership roles in your school, can you tell me what sort of things you've done in the past?

M: Yeah, uh, so we have a group of schools....of feeder schools that feed into the high school. And they formed uh, what's called a cluster to uh, maybe create a little bit better articulation from one grade level to the next. And so, I've been on the cluster board to

represent teacher interests at the high school level, um, did that for a couple years. I also was the union um, rep for a couple of years. Um, been a department chair once, we have a rotating department chairmanship.

I: mhm

M: Um, and um, then, outside of that, the leadership we did, it's been a little..it's been a little bit more vague and it's been more about um, having more informal contacts with colleagues,

I: mhm

M: Um, saying, you know, "Hey, have you tried this?"..right.. That sort of thing or, "Hey, could we work together to build up an exam together or build a lab activity together" or this sort of thing and try to uh, maybe take down some of the barriers um...so that my...my...my colleagues can feel like they're colleagues and not like they're isolated.

I: mhm

M: Sharing ideas, I guess.

I: mhm

M: and I think that's a...that's the most important leadership role that I think that I feel.

I: mhm. And do you ....with the just sharing and visiting with colleagues, has that been something you've just kind of decided to put yourself in that role?

M: Um, yeah....um, because the ..the school doesn't really, um provide this.

I: mhm

M: and the school says, "Look, you've got classes this, this, this, this. Goodbye,"

I: (laughs)

M: "and you, you've got classes dot, dot, dot, dot, dot. Goodbye." And...and it really has done very, very little ...uh, to provide professional development opportunities, and some

of that has been budgetary and some of it is just been benign neglect, but I continue to...to go to meetings and stay up on...on literature. And um, anytime I have a chance to do something here in town, like, um I guess, you know, the example that's really in my head right now is... Pacific Division is having our meeting here in San Diego this year,

I: mhm

M: and so I'm like, "Hey, you know, great. I'm going to go to that." And my principal uh, supported it and I have some sub days, so I'll be able to go to that and....and uh, get some fresh ideas maybe

I: mhm

M: on things that I can bring uh, into my classroom. And um, I think another example, like....like we had a um, modeling workshop here some years ago ...um, to talk about you know, chemists use models and biochemists use models, build molecular models to figure out what's going on, how things are going to behave....and so I went to this workshop. I'd say a lot of the stuff that they had was really not going to be that conducive to the way I teach and for what I teach, but they had this one thing called a cup of water, and I was able to ....to take that one activity and share it with my colleagues, and now all three of us use it.

I: mhm

M: and, it's a simple model, but, yet, very different than anything else on the market and it really demonstrates a lot of different principles very uniquely.

And, I'll say in a non-confrontational way I was able to share it with my colleagues and say, "Hey, would you like to try this? We can write a grant to....like, to get more of them so that there's a whole class set." Sometimes I look for them and I'm like, "Gosh, I'm missing some of these." And I go to the other person and say, "Hey, did you borrow

these?" "And yeah, yeah, they're here. Let me put them back." It's actually really, really nice um, because people have a better tool to use to ...to instruct students that..that we share.

I: And when you're sharing that information with other science teachers, are they teaching the same classes as you or are they teaching something a little different?

M: Uh, It depends, but like, uh, I have this one guy who's actually- I'm expecting he's going to be up at Bozeman this summer because um, it works for him.

I: mhm

M: Um, so he came on board just this year, and so yeah, I shared it with him,

I: mhm

M: Um, but I also share it with a colleague of mine who teaches at ....camp and electrochem course, she gravitated to it, as well, and the thing is ....is that the difference between, say, a ...a low level chemistry course and a high level chemistry course isn't necessarily that, um.. they're not going to learn the same basic concepts. It's just that you're going to expect more um, you're going to expect more ability from ...from the higher level students to articulate what it is that they understand about a given fundamental concept. Um, and so this particular lesson really ... What do I want to say? Just, it worked right across the board.

Now, on ...on a little bit different note, um, the guy who just came into the school this year, um, I'll say partly to fill the ....the void of me

I: mhm

M: reducing my ...my hours to a part time position, he's teaching chemistry. He's never taken his students out on a field trip, really.

I: mhm

M: And, uh, so I explained to him, "Why...you know, why... short change yourself that way? You've got the beach just down the street, and there's just so much chemistry going on there from a geology point of view,"

I: mhm

M: which that ....that's what I did my....uh, master's thesis on.... was designing outdoor activities uh, into the chemistry curriculum. And so, you know, at first, he was a little bit uncomfortable about doing this. He's just...." I'm with all these kids. What are they going to do? How are we going to do this?" Da, da, da da...And you know, kind of just like, "You just get into it," and kind of lowered the intimidation factor. He accompanied me with one of my classes, saw how I rolled it out. And now he's been rolling it out with his students.

I: So doing almost- What's that?

M: What's that?

I: So you were almost doing some modeling for the newer teacher so he could see how you were doing it.

M: Yeah. Yeah, precisely. Modeling for him. Exactly.

I: It sounds.... Go ahead.

M: Get something new going. It's like, "Gosh, I've never done that before. I don't know, man."

I & M: (both laugh)

I: With the roles that you've had that have been more um, serving on a board, serving on a committee, have they...have those roles been assigned more formally where you were asked by an administrator or how did you get into those kind of roles?

M: Um, well....I think that on some level just uh, being willing to.... fill those roles when they ....when they arose, you know... "Hey, is anybody doing this?" And, just rising to the occasion, saying, "Yeah, you know, I can do that."

I: mhm

M: Um, and then, like in the case of, say, union rep, getting voted in, um but, then again, maybe running unopposed because how many people really want to do that. It's like, "Okay, I know somebody really needs to do this, but you know, who wants to do that?"

I: mhm

M: And um....you know with the cluster thing, I live in the neighborhood in which I teach, and um...so..... I feel a great sense of responsibility not just as a teacher, but as a member of my ....uh, community to make sure to go the extra mile .....to make sure that our schools are strong here. And um, again, I ....I would probably- well I guess I am now back to doing it, but ....for me, part of getting ready of my surgery and then recovering from the surgery and .....and still not having full functionality that I used to after the surgery, all of that has definitely affected my um, level of being outgoing, I would say.  
(laughs)

I: mhm, Oh yeah.

M: Definitely a new awareness on my part.

I: mhm. Health issues definitely take a toll with something so energetically.....like a job like teaching and helping others, I think.

M: Yep.

I: Uh, with the different roles that you've had, whether it's been something um, where you've been asked and you said, "Sure, I can take that on" or whether it's helping other

teachers and sharing things in your building, have you felt like your involvement overall has been a positive experience or do you want to discuss your experience a little bit?

M: Yeah, but here's what I realize I need to do for the rest of the interview. I need to take a quick station break

I: mhm

M: and I need to get a.....a headset on so that I can hear you better.

I: mmmm

M: Ok?

I: Ok

M: Give me like a few seconds and I'm going to go grab something.... My ability to discern speech now in my left ear is pretty much uh, gone. Sn um....the um...That's the wrong way to put that in. Maybe that will work. I'm putting this thing here.....So..... Hopefully this is going to work. Can you hear me all right

I: I can, yep.

M: Maybe that will help me. Can you repeat that question again?

I: Yeah. Have you had or do you want to describe some of the outcomes you've had in some of your different leadership capacities ....and if they've been positive or negative or....?

M: Yeah, I think that they've been positive. I'd say that the....the larger community that we serve, you know, they're not professional educators, so they really, they want us to...to help inform um, what they think is a good idea, but it may not be,

I: mhm

M: let's say. Um, so there's a lot of value for that, I believe, even when it's at odds with what they think should happen.

I: mhm

M: An example.....some parents feel that more is better. It's just, "Let's have more of this and more of that and more of this and more of that." It's like, "Wait a minute...every....those ideas are good ideas, but every one of those things that you mentioned requires a teacher to perform certain roles in and we only have so many people to do so many things."

I: mhm

M: and sometimes, in their exuberance to uh, provide the best opportunities for their children, they have decided that the larger picture is just that their children are going to pass through ....through our system and then there's still going to be different children, and then, um even to the extent that- One time I.....actually, it was at an open house, I remember. I had a fellow teacher .....and, uh, during the open house presentation, came up and she was a teacher and I said to her something like, "How many students do you think I have contact with in a day?" She said, "Maybe 60 or 70." And, as soon as she said that, I realized that.... she was an elementary teacher. At the high school level, I'm seeing closer to double that many,

I: mhm

M: or maybe triple that many. And when she realized that, she's like, "Oh my god. That's crazy. That's a lot of student contacts."

I: mhm

M: On a different note, and, um, again, you know, very positive.....um, I had a guest speaker come some years ago and he gave a great presentation.....and, um I was debriefing with him uh, after the students had left.....It was the end of the day, and I explained to him what a mess my classroom is. It's so antiquated and poorly equipped to

do things that are, say, new or, um, at least, newer. He said, "Like, what do you mean?" I said, "Oh, you know, it starts off with everything from the walls to the floor to the ceiling.....Uh, outlets don't work.

I: mhm

M: Counter tops that have never been right to begin with.....uh, equipment that can't be used because the infrastructure is wrong.....um, not having um, PDA accessible opportunities for my students.".....and he said, "Would you be willing to put together a proposal, make a drawing or something?" and so I did that and then I didn't hear from him for about a year. And um, .....

He uh, sees me I think at another open house and he says, "Hey, you know, have you seen the plans?" I'm like, "Plans? What are you talking about?" It had gone from my, um, I'll say, very rough sketch,

I: mhm

M: my very rough you know, drawing of what things should look like and an executive summary of what a new building should be able to do, to now ....they're actually looking at building a new building.

I: Wow.

M: It will um, create, I'll say, substantially better and new opportunities um, for our students, which I'm particularly sensitive to now, even more than before, because I remember my wife, when I started like doing all these measurements and sitting down with my ruler and my pencil and all this.....and my wife saying, "you know, this is taking an awful lot of your time. It's really...it's not going to be worth it." I said to her "you know what, I'm not going to make any money on this, but I'm hoping that at least at some point in time that maybe my grandkids may benefit from this

I: mhm

M: and the other kids in this community." and so, I may never get to teach in it, but that's not a reason to not do something worth doing.

I: mhm

M: And um, so don't you know, now, I'm expecting my first grandchild uh, like now.

I: (laughs)

M: The 23rd is the due date, but you know my daughter-in-law is like....very, very ready.

M & I: both laugh

M: And so I'm still thinking, well gosh, yeah, even if it takes two to five more years for this to come to fruition and even if me and my wife, who also teaches at the same school, retire before my said grand baby um, gets to the school, I'll feel very satisfied knowing that you know, I did what needed to be done to help make sure that that happened. And I had worked in technology uh, for many, many years before I began teaching, so

I: mhm

M: I had something special to contribute to that.

M: and I'll say on a different note, um, with that cluster organization, uh, one of the very memorable conversations that we had in the early going with.....with the organization was, "what kinds of things can we do that are actually solvable,"

because the community, they were all over the place, all kinds of contract stuff with teachers and how to get disciplinary action taken against teachers that weren't pulling their weight or whatever. We told them, we said, "Look, stay away from that. That's beyond the scope of what we can do here. Now, the technology for the schools, that's a different story."

I worked with a committee for technology and we called in our district. Our school district, I want to say it's about 120,000 students. It's pretty big.

I: mhm

M: We hauled in our um, IT person or at least the person who said they were an IT person.... Anyways, and we said to him, "Look, we've got a problem here. We've got mailbox sizes for our email of 20 megabytes. And so we keep getting nasty-grams automatically generated saying that we've exceeded our ....our allotment. Because we have to document all contact with students and parents and administrators,

I: mhm

M: we can't just be dumping the old correspondence in the trash. It's just not...it's not okay."

So he went away and came back to the next meeting about a month later. He said "you guys are gonna be really amped. Um, I've computed out to where we're going to be able to increase your mailbox size 300%." You know, people in the room are like....they're like, "Wow....300%." So....I did the math a little bit quicker than some of the other people. I said to him, "Let me get this straight. You're telling me that now, a month later, you're going to let our mailbox size grow from 20 megabytes to 60 megabytes?" He gets this big grin on his face, very proud of himself, and he says, "Yes."

I: mhm

M: And I...I said to him, I said "wait a minute. I can get gigabytes with Google for email storage, gigabytes,

I: yeah

M: for free, that's searchable," because our email wasn't searchable at that point, either, "and you want me to feel good about this?"

M: And well, suffice it to say, he's not our problem anymore with our school district.

Now we have somebody new, I don't know if he's going to be better.

I: mhm

M: We've had interim people who, I'll say, I don't know if they've been any better, but

....we've at least had mailbox sizes that are ....capable of handling our professional needs.

And so that was a....and so we were able to succeed on that not just as a um, as a

neighborhood cluster of a high school with it's feeder schools, but we actually succeeded

on that district wide.

I: mhm

M: and that was...that was big. That was really big, so...

I: mhm. Um, do you think your involvement in leadership has progressed over your career?

M: Oh, Yeah, absolutely.

I: How so? Have you become more involved or taken on more responsibilities?

M: Um, I think I've taken on more responsibilities you know, outside my classroom

I: mhm

M: and I think that part of that ...uh, is...is a natural evolution from....uh, being a parent

and being a working stiff....um, get the kids here, get the kids there, get dinner on the

table to my kids are grown up and uh, they're out of the house and now, grace of god,

starting their own families, um, so feeling like I've had a little more um, time to do that

and ....and not quite so torn between, well "Gosh, do I give my time to my family or do I

give it to my school,"

I: mhm

M: because that's ....that's a tough one. I can never advise anybody to choose work over family. I....I don't have the ability to do that.

I: mhm

I: Do you think that the MSSE program helped with the progression of your leadership abilities?

M: Oh yeah. Yeah, absolutely. And um, I think that....and you know, that's a really um..... What you just hit on is a quintessential question see, because I'll say that up until that point in time, I kind of.....I didn't feel that I had the latitude as a.....as a teacher to change a lot of what I was doing. I felt more that, "Well, ok, this is the book. This is the curriculum, and I'm going to have to stick to this pretty damn carefully."

I: mhm

M: Um, and I think that the action research model actually turned out to be a very...very liberating um, thing for me. Uh, I was, I'll say, unambiguously um, cynical of any kind of research labelled research outside of....of hard research

I: mhm

M: where I can look at lab data. Any kind of humanities research, um, you know, my tendency is to basically throw the baby out with the bathwater and I'm okay.

I: mhm

M: And so I was really suspect of the whole concept of action research being...uh, useful. Um, and....I was suspect of the method, even, and um...but,you know, not to um, fret over it, let's just get started. Let's just see where this goes.

And um, I was working with Walt Woolbaum at the time, and um really you know, examined what I was doing professionally and I really took time to, I'll say, reflect on what am I doing and what would I rather be doing? What would I...how would I like to

change what I'm doing? And how would it benefit me? How would it benefit my students, my community? You know, what are my reasons for wanting to change up something that I'm doing? Um, so....kind of laying all of that ground work.

I: mhm

M: And the really crazy thing, the really, really crazy part was I got to the end of the research where I was tallying up my numbers, in which case, I had a ...I have a deep respect for numbers. And um, I hadn't done any statistical analysis for like, quite some time. I.... lagged in terms of when I completed my bachelor's to when I started my master's by about 28 years or so.

I: mhm

M: Um, so I'll say that I'm probably not ....not the conventional student, so to speak.

M: In any event, so I'm looking over my data .....and I'm doing the statistics on it and I see this number crop up where I'm getting this like, "Ding, ding. Hey, that's statistically significant. That's a statistically significant difference in your data."

I: mhm

M: Ans I looked at that and I thought, "No way. Just impossible," so I went back and checked all of my numbers, you know, check them again. You know, say to my wife, "Hey, you know, like, would you look at this too, like because I'm having a hard time believing that this statistical difference is here." Because like- because there's just no way. And there it was and that was with, I want to say, a group of 150.....160 students looking at year to year differences in ....in, uh, test results and....on the same test.

I: mhm

M: And I was just like, "That's....now that's just crazy. That's just crazy."

But it turned out that the data held up and the statistical significance uh, held up. And um, the um.....I mean I wrote it up and .....and I 've been doing it the same.....and....and even building upon it ever since.

I: mhm

M: Instead of doing like only, you know a few of these field walks, now, on any given day- Uh, well let's just say, this year we've got up to eight

I: mhm

M: and I'll probably do one before we finish up the year.

I: So quite a few.

M: Yeah. And the thing is is that it.....it takes the content from being something, I'll say, no matter how good the book is written, it's.....if it's in a book, it's esoteric,

I: mhm

M: I mean, but you can go out and see this. Then it's like, "Oh, I've got it."

I: mhm

M: And, if the instructor can figure out a way to .....um.....make the connections for the kids, um, then it's just been very, very powerful. Um, and with reference to the chemistry in particular, at the beginning of the year you have to talk about the structure of the atom, so what better thing to do than to go down to the beach where they can see a pile of beach sand and rocks that are made up of sand and a stream that, you know, through a water cycle, um....through it's water cycle, has been breaking down rock material

I: mhm

M: and talk to them about the early ideas of what does....what distinguishes an atom and the story of Democritus. You know, here you've got all of these fine particles. Could you

break them into you know, smaller particles? If you did and you kept doing it, what would it look like? I can actually start the year with the students down at the beach

I: Which gets them interested.

M: and talk about something they've seen a bazillion times, but never quite thought of it quite that way.

I: mhm

M: you know, later on, with ph, say, there's a place where we have some um.... seepage water where, in the summer time, the evaporation rate is so high that the ....uh, magnesium calcium salts in the water uh, precipitate out

I: mhm

M: and form this like.....cake, like on a teapot. Well, it turns out that this stuff is very alkaline and I can take little bit of acid from the lab, take it down to the beach, drop.... chip away the rock material, the ....the sediment, from the sandstone that it's deposited on top of and I can show them how reactive this substance is .....that any other time they would have passed it by and seen the....the algae and seen that it was different from the underlying rock but then never really thought anything about it

I: mhm

M: or looking at um, corrosion happening uh, on various surfaces of rocks and talking about heat capacity of the ocean, and uh, thermochemistry. You know it's like I.... I could tie it all together.

And by getting them outside, it's like, you know you get a breath of fresh air, stretch their legs, everybody feels good.....and you can even... And you can do it using that inquiry model too,

I: mhm

M: where otherwise it's just like barking a bunch of information at them.....but if you just ask them thoughtful questions, they actually come to ....to the correct answers or, certainly if not the correct answers, they find the answers that you need them to know,

I: mhm

M: eventually, if you can just keep enough questions uh, flowing their way. and...and it's an inquiry model. I cover more with my chemistry students now using uh, this.....you know, the fruits of the action research model.

I: mhm

M: I'm covering more content than I've ever covered before.

I: Which is awesome. Would you say that you already did your field walks before MSSE and then, through the action research, you've expanded on that?

M: Say that one more time, please?

I: Um, did you do your outside field trips like this before you did your action research and then you ....you built on this for the action research project?

M: No, I don't.....I don't think it was like that. I think I was not doing it....um...

I: This was a new.....this was a new thing and this was like a treatment that you added? Is that what it was?

M: Yeah.

I: OK

M: I mean...yeah, I don't think I was doing it before. I took my....You know, with my AP enviro class, I've

always taken them out into the field.....Always. Uh, but with the chemistry, I was much more, uh, for lack

of a better word, conservative?

I: mhm

M: And because of the fact that up until really just recently, the chemistry curriculum was something that

was being tested every year, so.....by the state of California, so they could answer to the, you

know, uh federal government to justify everybody's existence.

I: mhm

M: I mean, that's eased up a lot.

Which, another leadership piece that.....that I forgot to mention..... Quite randomly, I would- it was a Sunday uh, evening, I remember because 60 Minutes was coming onto the air and the phone rang and I thought, "That's weird. It's someone from the 202 area code," which is Washington DC.

I: mhm

M: and um, so um....I thought, "Well, I'm just going to go ahead and answer it," so I did. Well, it turned out that my local congressional rep was doing a virtual town hall meeting.

I: mmmmm

M: So I participated in that. I'm sitting patiently while other people were talking, and I uh, put my request in the queue, and I had....I had just gotten an iPhone.

I: mhm

M: So you know, I thought, "I'm just going to use this little iPhone to do this." Why not?

Um, so um, at the end.....at the very, very end of the town hall meeting, I had an opportunity to ask my question or take my opinion, and so I just went to...to the congressional rep, what a complete waste of time and money and energy, human capital,

you name it, doing all the standardized testing was....that it was.... It was hurting our students. It was hurting our morale as professionals

I: mhm

M: and it was....it was hurting our country. And um, she says to me, uh..."Would you be willing to write up a one minute speech that I could... would deliver to Congress on your behalf.

I: Hmmm

M: and I said, "Well, yeah, you know, I could do that."

and so, I got my pencil sharpened, so to speak, and wrote and rewrote and wrote and rewrote because it was only one minute!

I: right!

M: I had to make sure I was- I knew that, if it was more than a minute, it was not going to fly. Um, and, so submitted it, and then I get this uh email back from you know, her support staff saying, yeah you know, It's going to be delivered at you know, this time and you can watch it on this channel, and so forth.

I: hmmm!

M: and uh and then it got cancelled, so my students didn't get to see it when it ...when it aired live, but then they sent me a .....a CD with it...or a DVD with it and they sent also a placard...like a certificate you know, on government uh, stationary which had the text of what was said that day.

I: mhm

M: And um, it took about a couple of years you know, past that and I didn't have to give those exams to my students anymore.

I: Wow.

M: Yeah. And so that feels really good.

I: mhm

M: Now I know there are people that are making a.....a livelihood out of making sure that these tests never go away,

I: laughs

M: but um, they'll have to realize that there will be some fierce resistance.

I: mhm

M: It will not continue to go unchallenged.

I: No....when you think about the different things that you do, and you have a variety of things that you're doing as a teacher leader..... What factors supported your development?

M: Wow. Um, .....Um, I think a lot of it is just being really, really internally driven.

I: mhm

M: You know, it just has to do with who I am, how I'm wired.....um, being um, highly motivated. I haven't really felt very much support over the years um, from administrators. Um, here lately, I'll say, probably feeling it a little bit more than I've felt it in the past. We have a new principal who's been there for two years now and I think that he is going to be a breath of fresh air on ....on that. And I think that he shares some of my, maybe even a lot, of.....my.... my values, but, overall, uh, there's not a lot of support out there.

I: mhm

M: You know, there is really very few people out there to say, "Hey, you know, great job. You know, well done."

I: mhm

M: And, you know, that's also true uh, in the broader context in life, you know like parenting.

I: mhm

M: No one's there to tell us, "Hey, you know, you're doing a great job."

I: mhm

M: Periodically, there's punctuation marks, someone who off hand who says, "Hey, you know I met your son the other day. What a nice young man he is.

I: mhm

M: Right... You know you did a great job as a parent." Um, but that's uh.....but that's been relatively rare.

I: mhm

M: Mostly I think that because of the .....because of the way maybe even America is....uh, designed, I think that largely we're expected to find and drive our own destiny

I: mhm

M: and to define our destiny, define our own journey.....and so... I think that's how I'm going to answer that question.

I: mhm, mhm..Do you feel like the MSSE program helped support that journey?

M: Oh yeah, absolutely.... If you.....In fact, I would say that uh.....more so..... than anything else because it....it allowed me to feel that, in my professional life, that I was in the driver's seat in that regard, as well.

I: mhm

M: It's ....it's allowed me to take more ownership of what I do professionally.

I: mhm

M: If somebody wants to know, you know "Why aren't you just, you know, doing chemistry the way it's supposed to be done? Why are you wasting all of that time taking the kids outside?" Well, now I can just shoot back to them, "Well, maybe you should see my data."

I: (laughs) Right!

M: How about...you know, how about that? You know..since I started doing this, the.....those test scores have shot up.

I: mhm

M: When I came to school, they shot up 10% and they never went down.

I: mmm. And do you think that some of the questioning techniques that you use doing that, do you think you picked some of those up from the way that the program was modeled?

M: Um, there's that and.....and I also, because I've been at this for a while, I was...was involved in another um, curriculum adoption um, several years back. ....Actually, two of them, one in chemistry and one in physics. Um, and the one in physics got down to the root of questioning strategies. And even though the curriculum, I'll say quite frankly, was inferior, the questioning strategy was something really worth remembering.

I: mhm

M: And so when .....Subsequent to that, when the chemistry uh, curriculum was getting an adoption, um....the...the inquiry questioning strategy in the model, or guided inquiry, uh, came into play again. I'll say that that training probably was also uh, helpful. And, in terms of ....of um, the MSSE program, I think that since I already had some prior knowledge on um, what inquiry learning is supposed to look like,

I: mhm

M: I think that I was probably already receptive to how powerful it might be if .....if done uh, carefully and.....and with a great deal of forethought.

I: mhm. Do you think the MSSE program provided any triggers that encouraged you to further pursue leadership roles or further share lessons with other staff?

M: Can I ask you to repeat that please?

I: mhm. Did the MSSE program provide any triggers that encouraged you to further pursue leadership roles or further share content with other teachers?

M: Yeah, I think it made me a little bit more inclined to share with my colleagues. It definitely changed that.

I: mhm.....Do you think the comfort ability sharing came from more knowledge or an increase in confidence or ...?

M: Um..... I think that it.....in my particular case, it's kind of an editorial.....I think that one, just in life, you know, we're all on this one-way journey. I think that as I've gotten a little bit older, I've come now to the.....to the realization that other people are looking

I: mhm

M: to me for uh, new ideas that they might be able to use, say, in their teaching or .....or solutions to problems that they're having with.....with their instructional practice.

I: mhm

M: and .....and the key is .....that it's finding how to .....approach people in a way which is not confrontational

I: mhm

M: and....and lower the .....lower the intimidation for my colleagues to say, "Yeah, that is cool. I'd like to do that. Can you show me how?"

M: Today, an example, again, um, I've been very, very big on using demonstrations for students in the chemistry course because you can't let the kid do it,

I: mhm

M: but you sure can show them how it's done. And it makes a very lasting impact, particularly with blowing things up.

I: (laughs)

M: Um, and so some of my colleagues are really afraid of doing this. And um, so this new gentleman at our school, he's shown a real willingness to learn how to do some of this stuff.....um, the other gal.... My other colleague that he works with as well is, I'll say, less inclined to do the kind wof demos that make a lasting impression on kids.

I: mhm

M: It's like "pop" versus "Kabbam".

I: laughs

M: And... It makes a very big difference .....for kids to see a fireball exploding against the ceiling versus seeing you know, a little thing go "pop". It's just a..... different experience.

I: mhm

M: So I was showing him today how to set up .....uh, this thermite reaction and uh I told him.....I remember saying to him very carefully, I said.....the reason .....he asked, "What's the reason for doing this?" I said, "The reason is because of this," and I said, and "The thing is that with this particular reaction, you absolutely don't want anything going wrong." (laughs) He looks at me and he's like, "Yeah, I get it," like, because you're forming molten iron at 1600 degrees celsius.

I: laughs

M: It's really hot. You know, it burns through all kinds of stuff (laughs) And..and like, there's sparks going everywhere....and....and...it..... It's pretty intense.

I: mhm

M: But, uh, he's ready to do it. He'll do it at the end of the week. And he'll send his students off with a really good feeling for the subject for the year.

I: mhm

M: and um, and you know, he's definitely ready to receive it now.

My other colleague, I would show her how to do it, too, but she's so frightened of it ....you know, she's not comfortable doing it, so there's really no point in saying, "You really ought to do this."

I: right

M: She's just not comfortable with it..... I'm not gonna....I'm not going to change that. It's sad to me that she won't share that experience with her students because the students get a real rush out of seeing this.

I: mhm

M: "Guys, you all got to stand back. Yeah, I've got to do this outside. You know, GiVE me some space here."

M: Um, but you know...I'm not gonna....and now,

If my administrator were to say to me, "Well, I want you to be THE instructional leader and I want you to tell these other people what to do," well, you know, I don't know if I'd be that comfortable with that.

I: mhm

M: You know, if.....If you want to, it's like the horse and water thing. "Look, the water's here."

I: yeah

M: But, you know, dinner is served, but you don't want to eat.....you know, whatever.

I: Mhm...so you're more comfortable sharing things when people are receptive?

M: Mm-hmm. Absolutely. It's just more comfortable for everybody

I: mhm. Yeah.

Is there anything else you'd like to share with me about..um your experience with the MSSE program or your involvement in being a teacher leader?

M: Um, yeah, I guess just you know, the main take home is that it's the only master's program available for teachers that I'm aware of where you can come away with and instead of feeling like, "Gosh, I've got like, all this stupid stuff," I feel like I got a real strong benefit

I: mhm

M: for the rest of my teaching career that I can carry forward, that I can say that, unambiguously, to anybody, anywhere.

I: mhm

M: UM, I think that we could set up a satellite campus here in San Diego to...to facilitate more of this, you know, good practice um....because it's sorely missing and I think that um.....it's something that we probably need on a national level because I think it's probably missing elsewhere, as well.

I: mhm

M: And um, you know it allowed me to take science courses in the summer, instead of taking courses that're just gonna bore the tears out of me.

I: mhm

M: Look, like, I don't want to talk forever about how people learn and....and, you know, um, the hierarchy of...of Bloom's Taxonomy, that's what it is.

I: mhm

M: I don't want to talk about that stuff. I want to ....I want to talk about science. I want to see more science. I want to like, go out in the field. I want to.....like, when I was up there one summer, we made our own solar cells. I want to make something. I want to do something. I want to like....and it's the only program out there that kind of has that opportunity, I think.

I: mhm

M: I don't know if it exists anywhere else. I was very, very....I was very selective about which program I was going to....uh, participate in. I didn't want to pick up a master's in education. You know, it's like, "If I wasn't going to be able to take science courses, you know I'll just wait until I retire. Forget about it."

I: mhm (laughs)

M: (laughs) You know? I need to be able to take courses that .....that appeal to my outdoorsy, nerdy, science, weirdo.

I: (laughs) Well, and it sounds like the field courses..... you've been able to tie that directly in with experiencing that with your classroom.

M: Oh yeah, yeah, Exactly.

I: Well, thank you so much for taking the time to visit with me. I will send you a follow-up email and I will have a transcription of our conversation and then I will also ask for contact info for an administrator, like a building principal.

M: Yeah, and I actually talked to her about that just the other day...

APPENDIX M

MS. ACKERMAN TRANSCRIPT

**APPENDIX M**

Interview with Ms. Ackerman

I: Ok, so I guess, um, I've looked at some of the things that you sent in for your MSSE program application, and I was just wondering if you could me a little bit about your, your current teaching position and the school that you're at.

C: Sure. It's different than when I started the program.

I: OK.

C: So, should I start when I started the program? Or where I'm at currently? I: Um, why do you go with where you're at currently.

C: OK. Um, I'm teaching 8th grade earth science at West Junior High in Boise, Idaho. I: mhm. And how big of a school is..is that junior high?

C: Uh, there's a little over 900 students. Ok, and so, looking at how many teachers ...how many teachers teach what you teach?

C: um, 1 other teacher is a full time earth science teacher.

I: OK. And how many...um, what grade span does the school cover? C: 7, 8, 9

I: 7,8, and 9. Awesome I have to ask, because it's a little different everywhere.

C. Mhm. Sure, it's different in our neighboring district. I: is it? (laughs)

C: mhm

I: How long have you been at at this school

C: I just completed my second year at this school.

I: ok, second year. Ok, and then, um, through the interview, I'm going to ask questions that kind of piggy back off of ....of what you responded in the survey...and you had...you had said, you know, yes I'm a teacher leader. Do you want to just describe your roles that

you currently have? C: Sure. Um, one that...is a little bit different than maybe what you're looking for but... I'm our local teachers' association building representative,

I: mhm

C: um, and so I attend monthly meetings, and communicate information from that group to my staff who are members, um...along with a lot of other tasks throughout the school year.

I: mhm

C: Um...I'm also a building um..it's called a technical lead. I:OK?

C: And so we have instructional leads and technical leads, and these are just a couple people in the building that receive a stipend to help folks um, with what they need technology wise, um and then we also have what's called PLT time once a week. Our whole staff has paid time um, and every once and a while, we will help lead those uh, sessions as well. Um, on various things that they might need, whether it might be learning how to use google apps for educators better, or their grade book program, or um, other supplemental technology they might be interested in learning more about.

I: Mhm. And the the ..PLT, is that meeting as small groups, or it that working with the entire staff?

C: It totally depends, I: OK

C: ...we might have all staff, we might have break out sessions, we might do it by department. I: And then, um...on your survey, you also indicated that you serve as a department chair?

C: Well, I did. I...I don't any longer, so um..at the school I was at when I started the program, uh, I was department chair there.

I: mhm

C: And then when I changed schools two years ago, I was not offered that position at the school I'm at currently. I: mhm

C: Some one else is doing that. I: Ok, and then...

C: but I did do that for five years while I was in the program and after the program.

I: So you have the experience of ..of the department chair. What kind of duties did you do in that position?

C: Um, helped interview new hires, maintained chemical inventories, order supplies for the other science teachers..also lead PLC time for my department, um..attend district department chair meetings, communicate district initiatives, um...both in that role and at my new school, I have also been a a mentor for new teachers, um..which also a ..a supplemental payment, um to be assigned to a new..new person in the district and ..and help them with everything

I: OK, um..so it sounds

C: I've done a lot of different stuff

I: Yeah, it sounds like you have a lot of different roles that you fill. C: Mhm

I: um, with..with the technology type team, what kinds of C: sorry, say that again?

I: With your uh..involvement in like, the technology..technology team, how often are you providing professional development or what does that look like?

C: Well, we meet about once a month outside of school time to plan with each other, and then the time that we deliver material is only during that PLT time, which again, is once a week,

I: mm

C: but, we don't necessarily do something every week specifically, so I:mhm

C: it might be..and they're only 45 minutes a piece, so you could say..an hour and a half a month

I: mhm

C: on average

I: And for the involvement in that particular role, how did you end up in the role? Were you um..selected by an administrator, or did you volunteer?

C: um, both. Um, every...this is a relatively new program for our district..this this we just wrapped up the second year, um, and essentially it was designed to um, streamline some of the communication from the district of what/how they wanted that PLT time to be used, but it also was to try to continue to reward those leaders in the building who already do all of those things and help people, you know? So, um..it was kind of started two-fold, and it's a yearly application process, and so you put your name in the hat and fill out an application and then administrators interview you..and possibly select you.

I: ok C: so..

I: And then I also, I'm seeing that you, um..you ..you mentioned the mentoring, and is that...is that a similar process, where you have to formally apply, or is one where you just kind of decide to do it on your own?

C: It is, it's something the administrator asks you to do, it is by invitation. So, I suppose people could volunteer, but usually, it's, you know "hey, there's this new hire in your department. They teach the same subject as you, would you be willing to be their mentor?"

I: mhm

C: Um, and um, often times it's..you know.. beneficial to you to participate as well, so that way the person may..you know...learn some of the methodology that the building's

already familiar with and um, you know, grading philosophies and things that you would hope a new person would kind of get on board with.

I: mhm

C: and without..you know, any guidance, they wouldn't have any idea, so

I: right, yeah..I'm also seeing, and I'm not sure if this is with your current school or your previous school, but I'm seeing..um..reference to a curriculum team?

C: Oh yeah. SO, um..in our district, um, we give EOC's, end of course exams...so like every earth science course in the district gives the same final semester exam. And those often need to be revised and rewritten, and ..um... that's happened over at least..you know..ten years on and off

I:mhm

C: I've been involved in that, and then in the last year or two, we've also completely revamped our science curriculum for every content area to be more aligned with NGSS standards I:mhm

C: And so that took an extraordinary amount of work to try and fit a square peg in a round whole, you know, and make what...what we're already doing try to make sense with NGSS and move some units around and um, just try to better align um, you know, that curriculum. And so, it was...it was..it's still a work in progress, it's still awkward for a lot of teachers. Um, but it also involved rewriting...completely re-writing our..our end of course exams as well, so

I: mhm

C: Um, yeah. I...I was invited by ..my, um district science supervisor to participate in that...over many years.

I: mhm

C: Um, that person ..I know personally, and they know ...they know that I care a lot about...you know...current teaching practices and um, and so I've been fortunate in being invited to do that. That is an unpaid um, volunteer thing..often times they'll get a substitute for the day for me to come work

I: mhm

C: but, um, otherwise it's unpaid, so..

I: Ok. So you have quite a variety of things there, between...you know... C: Yes

I: working in through a curriculum angle and the assessment angle with the ...end of C:  
yep

I: year exam C: yep

I: um..and you've talked a little bit about how you've come into the roles, and they really vary.. C: yeah

I: where some of them, you know..you were invited... C: yep

I: or some you had to apply...so that's really interesting... C: yeah

I: How do you think, um, and it's..you might have a different answer for the different leadership roles...but, how do you think that you felt motivated to..to either want to apply or to agree to..to being in a role that you were ..you were asked to be in?

C: um, well, with the department chair, particularly, some...the person who was in the role before me was close to retirement, and they were pretty unmotivated to um, try new things, and um..so... in that capacity, I was looking to help my department be better and you know..be more cohesive and be more aligned with district initiatives, um...and um...with like the mentorship, um..I just really enjoy teaching teachers, and so, you know, that when I've been invited to do that, it was just a very natural fit and I think that, again, it was one of those things you would do anyways, and so...my administrators were

aware of um, you know, my being willing to help people and..and..and new that I would guide them in the right direction.

I: mhm

C: um, with the technical lead, um, that ....I..this...this particular...because I'm not department chair in the new building,

I: mhm

C: I was looking for an opportunity to continue to be involved, and um, you know, kind of missing that part of my career, uh, that I had at the other school, and so, you know, I think that was part of my motivation, um to apply for that, um. And then on a grander scale of all of those positions, um, more on a personal note, um, my father-in-law um, worked for the district for a long time, in science. My dad worked for the district as a science teacher for about 8 years, and my husband is a district science teacher, so ...um, there's also a lot of, you know, family um, influence in um, stepping up, and um, participating, and..um..doing the right thing

I: mhm

C: so..

I: How do you think that your involvement in your variety of leadership roles have complemented or contributed overall goals?

C: My overall goals for...

I: just, you know, as ..as a professional, as an educator..

C: Sure. Um, well they certainly have given me a window into why we do some of the things that we do in the district and I think that that is uh, empowering in..you know...understanding....basically, if you just stayed in your classroom with a closed door,

it's a lot easier to get frustrated of the things that you'r being asked to do if you don't understand why.. I: mhm

C: so...um, you know, I think that being involved has helped with my goals of being a better educator in that I can..understanding why..why we're doing what we're doing, and ..and just making my day to day existence um, makes sense in the little part that I play..know you...everyday.

I: mhm

C: that was kind of a weird answer...sorry

I: No, no..not at all. And I wouldn't ..I wouldn't say that it's a little part, I think it sounds like you..you have a lot of roles you carry out outside of ....outside of being a classroom teacher. Um, have you felt that serving in your various roles have ...um...have been a positive experience?

C: Well...overall, yes. There are certainly...um...some negative aspects...you know? But, um...that comes with sticking your neck out a little bit to ..you know..help and volunteer and uh, be a go to person for a lot of people

I: mhm

C: so it can add stress, I: mhm

C: certainly, um..but, um...you know,overall, I think I ...I ...I sleep better at night knowing that I'm workin' hard

I: mhm C: so..

I: And you've mentioned a little bit about the two different schools,

C: yeah

I: Would you just...um...tell me a little bit about ...if you can think back to your early years as an educator, tell me a little bit about how your involvement in leadership roles has changed or progressed over your career?

C: Sure. Um, in..in the beginning of my career, I certainly think I was a little more anxious to prove myself, um..and earn respect...and now it's more... I have a different perspective and that I ..I know that I'm knowledgeable and I'm willing to share

I: mhm

C: rather than trying to prove anything to anyone. So, that was difficult moving to different school because many people there did not know what I could offer, and so it was ..it was a little bit of a humbling experience, to um, come into a building...and..and..and have had all this experience and be willing to help, and for a while, nobody was really interested in my help (laughs)

I: mhm

C: but, after two years of, uh, trying to keep my nose down and help where I can and you know..be respectful of all those in other leadership roles, um..it's ..it's kind of come full circle, so I hope it continues to grow.

I: mhm. And you mentioned an interesting transition from being...maybe being known as someone that can help in one building and then you move into a new situation and have to almost rebuild that...

C: yeah. Yep.

I: Do you feel like..as you've progressed in your career, you have been more involved, C: yeah..um

I: then when you first started?

C: Yeah, mostly because of... just of the opportunities that have come up. Um, you know..certainly with the curriculum re-writing, um, that was a big undertaking, um..and then the..with the tech leadership roles and the additional of PLT time, all of those district choices and movements and angles have provided opportunities to become more involved

I: mhm C: so...

I: How do think the ...um, MSSE program impacted any sort of progression or development in your leadership role or ability to fill a role?

C: Well, it ...it gave me ...a lot of ..there's a lot of different angles I could go with this... um, being involved in a program where I was working with other science teachers was a very unique experience for me because in my bachelors' it was education classes and science classes I:mhm

C: and so...we had one quote science teaching class, and that had four students in it, and so

..and it wasn't very interactive., it was sit and watch power points basically, so um..the ..the program was such a cool experience to get to interact with other science teachers about teaching science. And it ..it gave me a lot of confidence and um..certainly I walked away with a refined practice of why I do the things the way I do and how I teach...um, which in turn, allowed me to provide better leadership for my..my staff, um..and the people I was mentoring, and still am..

I: mhm

C: Um..I think it also opened a lot of doors..or opened my eyes to a lot of different resources, and so, curriculum wise, that I didn't know about before and so..um, that certainly has added to the variety of thing I do in the classroom, um...there was something else I was gonna tell ya....Ask me the question again, will you? (laughs)

I: Yep! How did the MSSE program impact the progression of your leadership involvement or the development of leadership skills

C: sure...Oh..so, um..my capstone project was about teaming in middle school, and so..are you familiar with that concept, um?

I: I think, but do you want to explain what it looked like in your context?

C: Sure. So, um..at my previous school and this school, we have a..a teaming time. So it's an additional prep during the day. We don't have students, we are paired up or partnered up with three other teachers of the same grade level, but different content areas

I: mhm

C: and, um..so I suppose you could see that as another leadership (laughs) role...

I: mhm

C: being selected as..you know.. one of the team teachers, um..and the program..I..what I was trying to figure out what to do my capstone on, at the time, our team was struggling and the concept of teaming was struggling, and people were...had very little training in what to do with that time, how to utilize it appropriately with the philosophy that were behind it in the first place. You know, it's not just a time to sit and talk about your weekends and complain about kids, um I: mhm

C: and so...I just saw this opportunity to dive into it more deeply, learn about it myself, share what I what I was learning with my colleagues, ...I did a lot of surveys and information gathering from my colleagues to try and make it...the time more useful for us, for our students, for our building, it continued to help justify how wonderful the time could be. Um..because it's something that obviously the district is paying for..for us to not have students in our rooms...they're some where else at that time, so

I: mhm

C: You know...it was always something that was kind of like-----the people upstairs didn't always see the benefits of it and I wanted to make sure that we were understanding what it was for and utilizing it better, so....I would say, as far as helping me develop into a leader, just having the chance to dive into a topic so deeply with support from the program, from my professors, from my ..uh..classmates, who were reading and revising my work and..it was ..you can't put a price on that in my opinion, so.

I: Did you.. and you mention with that experience, really the capstone.. C: mhm

I: Did you..um... feel there were any other experiences through the program or even --a-specific courses that really ..really supported you as you developed those leadership skills?

C: No. I mean, the other courses that I took were ...specific content things I was really interested in,

I: mhm

C: you know? That I enjoyed personally. Um, I can't think of any other specific courses that directly assisted that particular aspect.

I: So really, the capstone, you would say was the big ...from the program it was the ...

C: It was so structured, it so ..we were walked through it so well that it..um the organization, the support was awesome

I:mm

C: and...I don't..it was always amazing to me how some folks didn't complete certain portions....I'm like "they're holding our hand through it all" (Laughs) it's like, get on board. But um...yeah, I think it did teach me a lot about patience with the process as well.

I: mhm C: so..

I: Were there any specific factors or triggers ..um.. and this could be..you mentioned having a lot of..of..science teachers in your family..um, this could be within that...or at school or um.. um..or from the program... were any specific there any specific factors or triggers that ...that really motivated you to take on additional roles of leadership?

C: Specific factors....Um...I don't know...I think it's just a deep personal desire.. I: mhm

C: to be involved, um..it's just a lot of self-motivation..you know..from ..throughout my life of wanting to be involved and help out and ....be in the know of what's going on,

I: mhm C: so..

I: And you mentioned that the capstone really was the the component that helped with your leadership. Um... were there ...were there any ways that you could say that your capacity to serve in a leadership role changed?

C: Well, through the process of developing surveys to give to my other teaming colleagues, I certainly learned how to ...um...appropriately word questions so that I was soliciting helpful information and not...trying to cause problems, you know?

I: mhm

C: I didn't ...I didn't want to ...stir the pot in complaining about the system and, you know, our lack of direction, or whatever, but...so there was a fine line that I had to walk to gather information without seeming like I was pointing fingers...um, and so through that process I learned how to be delicate in ...um, helping solve problems...

I: which is a challenge

C: It is, and I'm certainly not awesome at it, still, but it did...helped um, develop those leadership skills..I think, a little bit.

I: mhm. It sounds like you had uh, a good experience with the program, and um, the feedback from the MSSE program ...I think that you provided in your survey was ...was

positive...but in the spirit of continuous improve, what do you think the MSSE program could do to further support leadership development?

C: It's hard to say, I haven't really thought about that question a lot, um...but I ...I would think that , you know, providing opportunities through out the courses as we are um...completing activities or completing assignments or practicing various skills in our classroom, you know, for different courses, to involve components of those assignments where the MSSE student is asked to get feedback

I: mhm

C: on what they're doing from colleagues in their building. And I think that that's a really awkward thing for a lot of teachers to do...is to..you know...ask a colleague or an administrator to look over what they're doing without an evaluative lens...

I: mhm

C: Um, but...without that being a component of some of the activities, people will often again just keep their doors closed and you know...do what they have to do..or complete the assignment and not maybe reach out on a building level to see how it could be involved with their colleagues

I: mhm

C: Um,...and then with the capstone in particular, I could see how that entire project could be so self-contained within your own classroom and not necessarily need input from your colleagues. You know...you're...you're..you're essentially conducting an experiment on your teaching practice and you don't necessarily have to go talk with other people..so again, if there was some component of the capstone where it was asking graduates to get out and ask for information or ask for you know...someone to watch you deliver this lesson, or whatever, that that might help um...make those...those opportunities

for those teachers working on their masters' to then also show their own skills in being a leader. You know, asking for help and building those bridges with their colleagues will further develop ..you know...their colleagues knowing what they're capable of, and um..what their interests are, inviting an administrator in, and then they can say "oh, well this..this teacher is stepping up and willing to ask for some help and some guidance" you know.."Now I see what they are capable of" and..

I: mhm

C: Um....That`s kind of rambling, I'm sorry again. (laughs)

I: No, that 's really good..really good feedback...I'm hearing a lot about ...about collaboration, or um..not just

C: yeah

I: not just being the isolated teacher with the door closed, has that been a big building block for you in being a teacher leader?

C: Like, personally, or with other colleagues..or?

I: Um..for you, um..being able to take a step outside your classroom and...and work with other colleagues, or get feedback or work in some way where you're collaborating, has that..has that helped?

C: Um, yeah. I mean, I ..I think I do that naturally I:mhm

C: so..it's ...it's something that I think is ..I'm mentioning more often because it's noticeable around me, where people are not interested in asking question, or you know, reaching out, and

...I sort of see that..their practice becoming a little stagnant.. I:mhm

C: Um, and ..and um, you know, I think the capstone ...my capstone project also opened my eyes to a different type of middle school environment that could exist, that's more like

a family in a sense, where you are all working together for this group of students ..um, it's just a totally different environment than a high school or an elementary school...

I: mhm

C: so..um, I think having those open doors and collaborating is something that our PLC stuff has tried to do, but the sort of spoon fed "this is what we're doing today' during PLC time

I: mhm

C: really goes against the grain of what a professional learning community is supposed to be, you know..it's supposed to be everyone involved, and ..you know...um, doing what you all want to do together, not what the district wants you to do in this forty-five minutes, so...

I: right (laughs)

C: It's...it's ....it's really been hard to get that time to feel useful for everyone. I: mhm

C: Um..and there's a lot of other logistical challenges within that, but um...yeah.

I: Do you have any thing else that you would like to share about your experience as a teacher leader or experience with the MSSE program?

C: um...I don't think so...I think I covered a lot of stuff...um..I just ..I just have to say I really enjoyed the program, I think it was organized very well and was always...support was always there on an administrative level as well. You know.. those people do a lot for us, and um, I just

...I just think that they have really great people on staff, um that helped a lot.

I: Well, I thank you so much for your time....um, what I will do is when I uh..transcribe the interview, I will send you a copy through e-mail, and if there's anything that I

mis-heard or doesn't look right, just send me a correction, so it's accurately representing what you said

APPENDIX N

MS. AKIN TRANSCRIPT

**APPENDIX N**

Interview with Ms. Akin on May 30th 2016

I: Ok, so um, Alice, I am just going to ask a few questions about your context of where you teach, so um,

K: ok

If you just want to tell me a little bit about your current teaching situation, the size of the school... K: Yeah. Yeah. Um, ok. So, I teach in Chicago, Illinois. It is um it's a pre -k -8 school. We've got about 550 kids. And it is 99 percent free and reduced lunch um, and then I teach fifth grade reading and science.

I: OK. And is this, I noticed in your application information to the program that you were at Frasier Prep. Is this the same place or is it a different school?

K: Nope, it's a new school now.

I: OK. And you have been in that school for how long?

K: Um, I was at Frasier prep for five and the school that I'm currently at, I've been there for four. I: OK. So it's a pretty good sized school.

K: Yeah.

I: OK, so if you would just describe um what kind of roles you've taken on as a teacher leader, or um what you're doing within that school or even just you know, within the state as a teacher leader.

K: Ok, um, I am..I definitely am a teacher leader for literacy. Um, and then for science, I um, run the STEM fair

I: Mhm

K: at our school, so I coordinate all that. Um, and honestly, most of my leadership is falling within reading just because that's where our emphasis is now just for ...based on the needs of our students. So for science things, it's like I said- the STEM fair and then reading is the literacy lead and then I'm part of like a PLT for common core state standards, which is where we're trained to coach teachers implementing the standards.

I: OK. So when you're working with your....your PLT and you're being trained and those are more literacy standards?

K: Yeah.

I: OK. So even though it's not specifically science related, it's still a pretty strong leadership role. Do you want to just describe how ...how you've provided professional development that helped other..other teachers from that role?

K: Yeah, so with assistant principal um, what we do is we have clusters every week where we meet with grade level teachers so I help design um what we're going to talk about that week in our objectives, and then I help to um create um the presentations, and then usually based on scheduling like I'll sit in for some of them. I usually focus on three through five

I: mhmm

K: An then, um, we adopted the Engage New York reading curriculum and so, I went to a training for that last for that for a whole week last summer, and then I was kind of gave PD's around implementing it and modeling lessons and putting that into practice into our classrooms. I: Awesome. Awesome. When you have done this sort of professional

development or like, going to the training, learning things, and bringing it back, is that usually within your building, or is it more in a district-wide sort of reach?

K: No, Just mainly our building. I: Mhmm

K: Yeah, in Chicago, schools run pretty isolated, um just cuz our district is so big, we tend to tend to keep most things in the school, like especially if you're a teacher leader.

I: Right. There's so many opportunities, I'm sure, in a bigger school. K: Yeah..

I: And you said you work mostly with 5th grade, right?

K: Yeah, 3-5 is kind of like my grade band that I like help with when I lead and then specifically for me, I work with a, 5th grade.

I: OK. So you're helping, you're helping with the professional development for other staff probably 3 through 5.

K: mhmm

I: OK. So in looking at this role, how did you um, how did you come into it? And you can talk about all of them, like working on um, the fair, working on PLT...How did you get into that role? K: Um, with the science, everything science related, we like kind of came into as a bargaining, like they knew my masters was in science, but I helped open the school, so that first year that we opened, we didn't have enough teachers, and so I got originally hired for a science math teacher, but they didn't have reading and I had the most experience of literacy, so I kind of got thrown into the literacy piece, just by default, and then um, and came with like, well then I want to do this for science, I also still want to teach science, that's why it's such a weird literacy science combo,

K & I: laugh

K: Um, everyone's always like "you teach reading and science?" It's like, yep, sorry. Um, so that kind of came with me asking for it. Literacy has kind of all just been thrust upon me, and then my AP just kind of keeps keeping me in that wing, and then, now that I'm on the PLT, that I know I'm just kind of staying in the reading area, especially now that I'm being trained on the reading curriculum. I am very far removed from the math now.

I: mhm

K: And, um, so yeah. All science kind of stuff is my own doing and what I want to do with it, which is nice because I have a lot of freedom with like the STEM fair and what we do for science and like, implementing science in our school, so that's nice, but um, reading has all just kind of been assigned, and fallen into place, and I just think it's sticking around now, so.

I: right.

K: Did I really answer it, or did I go off base? laughs I: No that's exactly what I'm looking for. And so,

K: OK

I: Just to reiterate, you said, when opening the school, they knew you had your masters in science, so you were hired originally with science and math focus?

K: Yeah, but I wasn't finished yet, I think it was like my last year... I: Ok

K: with the program when I got hired.

I: So they knew you had that background from the program?

K: Yeah, like they knew that...yeah, they knew that's what I wanted and that's what I was focused on.

I: mhm

K: And so, we, the literacy teacher fell through, and at that point, I was the only 4th grade teacher, so I think they got scared, so they put me in reading

I: right

K: when they hired someone, cuz that was like a brand new teacher and stuff, so

I: right, and you mentioned that literacy is a big...a big issue with your students, and so ...

K: Yeah, we really under..like, we have so many students reading below grade level, so that's kind of like where our focus really is at our school

I: Um, with ...with the literacy responsibilities that have been kind of thrust upon you, has that been coming from um, an administrator, a principal?

K: Yeah, my AP, it's who I work most closely with and she's the one who kind of, you know, keeps me around for that stuff.

K & I: laughs

I: And, um, when you're looking at at the difference between the roles you've taken on by choice, and they ones that you've been kind of um, assigned, do you feel pretty satisfied with both, or is there a little bit um....

K: I actually do. Like, for a while, I was really hating the reading, like that first year, I was like this is not going the direction where I want it to go, but I mean, honestly like now that we've adopted Engage New York curriculum, I've been really happy with it, and honestly, there's a nice, like, science piece to it, and they do a really good job with informational text with science. I know of like, it's not like it's science class, but it's an interesting way of incorporating literacy with it

I: mhmm

K: So I've actually been really happy with it, so like this next quarter is all like, science informational and it just tying nicely with like what we do in class and stuff, so it actually's all kind of panned out.

I: mhm

K: I think for the best.

I: And with the STEM fair, um, what were your motivations with, you said you ..you kind of asked for that responsibility? What were your motivations for wanting to be involved in the undertaking of of that fair?

K: um, Well, I definitely wanted to be a part of it, and like, didn't want to lose sight of um, with like my degree, you know like, I know , like I'm teaching...a big part of my...a big part of what I do now is literacy, but like, I still wanted to keep that science piece, um, and make sure that it also wasn't just like, science reading, you know, where I think a lot of school just like- oh, we teach science cuz we teach it by reading, you know.

I: hmm

K: So making sure we kept on that hands on piece, that inquiry piece, and then also just getting to build it from the ground up, and deciding how to do it, like one year, we did it as an after school program and then now this year it was like the first year where we all al 4 through 8 students do it, so it's just been kind of nice to like, grow it and work with people who are doing it as well.

I: mhmm, mhmm. And in that role do you find yourself having to um, provide mentoring or helping other other teachers-especially with the span of it going all grades or through

4th grade? K: Yeah, there's..there's a lot um, yeah there's a lot of it, like helping teachers find projects with the kids, and then like, finding time for them to do it, and how to manage it, and like teaching a lot of teachers how to do that, that's a huge part of it because there are some teachers who don't have a lot of um, experience with it, so

I: mhm

K: It's usually the middle school teacher and me who are really like, helping the lower grades and stuff.

I: mhmm

K: And also, I think with um, such a heavy emphasis on the core math and literacy subjects at our school, just because of um the academic um scores of our kids, like, it's easy to like forget about science,

I: mhmm

K: and so it's nice that we have some there because it keeps that in perspective and it keeps that emphasis present in school.

I: mhmm

K: I think if we didn't have that, I really think there'd be not a lot of science going on, so  
(laughing)

I: right, and I've heard

K: and that that's just the nature of like low test scores

I: and in the elementary that seems to be more common...where K: mhm

I: if the test scores are low the focus is on reading and math K: exactly.

I: Um, with the leadership roles that you have taken on, the STEM fair, and PLT with the um providing professional development in the literacy component,

K: mhmm

I: How do you feel like those roles have complemented your overall professional goals?

K: Um, I think it's help, I mean it's helped. I think right now I'm still undecided of what I want to do, like I don't know if I want to transition into a coaching role, but it's definitely giving me some hands on experience, and also I think it is making me just a better teacher because as I see others I can put it into my own practice as well and I'm definitely not apposed to the idea of being like, just just teaching for my career and not necessarily like moving up,

I:mhm

K: cuz I really like teaching, so it totally not decided, but I think for right now, it's like a good limbo if I want to stay just teaching or if I want to move up to slowly coaching, so it's definitely given me you know, just more perspective on other options and then also my own teaching practice.

I: mhm

K: Especially like being model teacher and stuff and you know.... I: absolutely

K: perfecting what I do

I: absolutely. Um, How would you describe the progression of your leadership involvement over your teaching career?

K: Hmm. Um, I definitely think I started at square one, and worked really hard to like work up, and people that I work(ED) for like, I've had to like I've worked at both schools

- so my AP I worked with at Frasier, and then she went to this new school herself, and so I went with. Um, so we've had a lot of time to grow together, and she's seen me progress,

I: mhm

K: and then as I'm ready, like definitely started off small, giving me more roles, and then now, she's just able to give stuff to me and even when I want stuff too, I know how to ask for it, and get it on my own, especially with like, science or things that we might need for that, um...I'm trying to think... Buy yeah, I definitely started off like small and you know, just started with helping with the PDs and just giving my input, and then helping out occasionally, to then being like more formally assigned on the PLT, cuz that actual time commitment and things that you have to attend and have to do,

I: mhm

K: I guess, does that really answer it? I don't know, that one's hard. (laughs)

I: mhm. Um, and just thinking about you know, you're ...you're leadership progression over your... your career...how do you feel that the MSSE impacted that progression?

K: Umm, I think with..in regards to science, it helped me to be more vocal about like, not getting pushed around with science and stuff, and also being like, we need to do this, not just like " here's an article on tornadoes, look, I taught science", kind of deal...

I: mhm

K:so, You know, it's definitely helped me like fight for that and stand up for that, um...and then it's also just helped me be more creative in making it work, because we do have time commitments, and like, I do get pushed into the literacy aspect a lot

I: mhm

K:so, um, I think with that, it helps create awareness, and then in regards to literacy, I've taken a few literacy classes through MSSE, and I think that helped incorporate it more and when I am doing literacy -like science through more literacy based activities -like how to do it and make it still be valuable for literacy and science..

I: mhm K: so...

I: Do you feel like there were any specific factors um along the way, whether it was factors coming from your school or factors coming from the MSSE program, that ...that triggered a um...a more active involvement in leadership roles?

K: Um, I just think like with doing my masters and everything, I was just more ready for it all, and I think just being in MSSE like it helped ask for stuff, it helped develop like those skills to like go for it...I guess.. more

I: mhm

K: trying to think...um...and I definitely think like, when I was with um, ...my advisor was Walt, like he really helped me like figure out how to ask for stuff and how to have these professional conversations, you know, just I know..like when you're doing your Capstone and everything, like trying to find that time, like I felt like really uncomfortable being like "I have to teach literacy, but I'm supposed to be teaching science for my Capstone" and he helped me navigate that process,

I:mhm

K: and then I guess in turn, just find that ability to like, advocate for things that you wanted to do. I:mhm. So it's sounding almost like, um, for you, the program really helped...helped you be able to communicate your needs better?

K: Yeah, I think so. That, and balance it out ...

I:mhm, between the two roles? The literacy and the science? K: Yeah. Mhm.

I: Did you feel like...you mentioned the capstone, Did you feel like there were any other, um, specific courses or any specific experience in the program that helped support your development as a teacher leader?

K: Um, yeah. Like I said, I really enjoyed the literature ones I took, I really can't think of the name of it right now, but I took one where it was empha...the emphasis was on wolves,

I: mhm

K: and then we read lots of different text and then just about how to bring it into the classroom and use that, and I really loved that course, and it was really funny, this past year, the third grade, with Engage New York, one of their models - one of their modules was um, I can't remember exactly, but essentially, it was around wolves and um, they read several different texts about wolves, so like that was kind of... I mean that was like a perfect coincidence, but like, seeing like that course and then when like a teacher was trying to do it, and they were struggling cuz they're like "I don't get it. I don't know how to do this" with like the science based text, I:mhm

K: it just all fit nicely, so the literature courses really, really helped. Um, and I think, just at the end too, the field study courses, just even as an adult learner, how beneficial, like that hands on, 100% in experience you learn from, like I think that just helps me ..like in my own teaching, like this is effective and like, what kind of experiences are so much

more effective than just your typical teaching, so I think that course just helped you know..like, helped me see that.

I:mhm.

K: and reiterate that with me

I: and I think that the field course..is that the dinosaur paleontology course that you're referring too

K: mhm

I:yeah. And then I think the um, the - I was able to do a review of documents so I think the ... the literacy class must be the "integrating literature into science" which would be perfect for your situation...

K: Yes, Yeah, and I really enjoyed that class, and like it's helped because like I said, the Engage Curriculum, like we love it for literacy is that two modules are very scientific and two are very social studies oriented..

I:mhm

K:The scientific ones are very intense, and then that course kind of helped...you know, with that.

I: mhm. How do you think, um, the program changed your capacity..because it sounds like You started out, you said you started kind of from the ground up as teacher leader, taking on little bits of responsibility...

K:mhm

I:How do you feel like...like the program um, changed your capacity as a teacher leader?

K: Um, it definitely pushed me. Um, and challenged me in like "can you do this?" And I

definitely like, poor Walt had to deal with me for way too long, but um, just balancing more responsibility while still doing your...you know..the rest, other stuff at 100 percent, and then also, like finding a way ...ways to make it work. Um, and then just how to...yeah..I guess it's just like continued to pushed me I guess. And then as it happened, I kept learning and then kept trying new things..going outside your comfort zone, and yeah. It was, it was an interesting experience. I:mhm

K: Definitely closer towards the end (laughs), so like I think I extended- I extended my program by a year because that was when I switched schools and I couldn't manage it I:mhm

K: and it was really hard, cuz I had to switch so much, that like pushed me in a way to keep persevering...cuz I really did just want to be like done with it, and that's like where Walt came in and like really just saved my life in many ways (laughing)..with just staying the course

I:mhm

K:so.. it definitely challenged ...a whole new set of challenge of like managing things

I:mhm

I: And you mentioned that...in your..in your current um, school, you do a lot of of professional development, for mostly literacy.

K: mhm

I: Do you feel like there's any link in having engaged with um, the discussion, or having to present your capstone, that you picked up some skills or some experiences that helped support you with what you do now?

K: Oh, definitely. I believe, like the capstone really helped build confidence, like I mean that was the really intense project, and when you were done and you had this thing to present, and you were very proud of it, and you went and presented it, I think like that helped build confidence to take like into school leadership, and knowing that like you can stand up in front of someone and give them information and be an expert, I guess.

I:mhm

K: so, that definitely helped..but that was definitely one of the most terrifying experiences, but really, the most rewarding.

I:mhm. In like, the spirit of continuous improvement, most people that visit about the MSSE program have pretty positive feedback,

K: mhm

I: but what do you think the program could do to further support leadership development?

K: Um, ....Just think, I don't know if like, there could be just some courses maybe designed around it? Like, you know, I know everyone taking the course, typically or majority is a teacher, but maybe like courses of you know- of taking that leap to more leadership or like, coaching other teachers or collaborating with other teachers or um, yeah, or implementing new ...like how to do that...like implementing a new curriculum or even proposing change...like school change...like I don't know if there could just be some different courses maybe focused around leadership?

I:mhm

I: excellent. Um, do you have any questions for me, or anything else you would like to add?

K: Um, I think I'm ok. I mean, like you said, the feedback is overall positive, like, loved it, even like when I did struggle, I think that was like one of the best things about the program, because I mean I'm sure you have my transcript...you can see like when I took um, stats... like that was literally the worst. Like I had to take it twice, (kind of laughing) an like for me too, like I've never failed before or anything, so like, it was humbling, yet like a huge learning experience, and it was nice that like you could do that in like a supportive environment..

I:mhm

K: And, you know, like it wasn't necessarily like, oh it's ok, we don't care, like there's high standards, but yet you could still overcome and move forward and stuff, cuz that was definitely like, a tough spot..

I: mhm

K: So yeah, that's like why I think I really enjoyed the program...just like it allowed me to like experience you know..so many new things like that, even positive and like in that case, like a negative learning experience where you can learn from, so

I: mhm

K: Well if you have any, um questions for me, or anything, you can always send an e-mail. And I will e-mail you the transcript of this and just make sure that I've heard everything correctly and that what what was said is what you intended and so

K: mhm

I: I'll send that just to make sure. K: Ok, perfect.

I: I really appreciate your time so much, thank you!

APPENDIX O

MS. MINSKE TRANSCRIPT

**APPENDIX O**

Interview with Megan

I: I need to ask, is..are you ok with me taping it? M: Yes, that's fine.

I: ok. So, first I think I'll have you just tell me a little bit about your current situation as far as, what you're teaching, what you're responsibilities are?

M: mhm. Sure, I uh, I just started in January, a full time position as a biology instructor at the University of South Carolina Beaufort. And, uh, so they brought me on to teach freshman biology 101 and 102, um, I also have been, well, I've been adjunct at the university for 2 years, and I taught and continue to teach a non-majors biology, an environmental biology course. But they brought me on mostly to revamp their freshman biology labs, and to also start a uh..or to help start a um, secondary science education..well not really education degree, I shouldn't really say that, secondary science teacher program, so..students with..that are majoring in biology would also have the opportunity to work towards a uh, teaching degree too, in secondary science

I: mhm

M: and, have that option when they graduate. I: mhm

M: So, but really, it's been mostly um, teaching and re-vamping the labs (laughs). I: mhm. Ok, and you said you were at um.. University of South Carolina..

M: Beaufort

I: OK, and how long have you been there? You said you started full time, but you've adjuncted for 2 years. So have been there for about 3?

M: I've been.. yes, so this coming up fall would make three years. This fall semester,

mhm I: mhm. And then, when you filled out your survey for me, um,

M: mhm

I: you listed a couple of leadership roles, like you had science fair coordinator, and you had identified as that you had applied for the position?

M: Um, ...for I'm sorry, for which one?

I: Well had listed that you were a college teacher and that you were..um, a coordinator or helped with the science fair?

M: I had. So, when I moved to um...I taught in public school for ..about a total of 7 years

I: mhm

M: and, um..at both uh, at the high school and middle school level, I was always the science fair coordinator, and then at the middle school, I was the science chair. And, at the time, well they do actually pay extra now, or give a stipend. But at the time, it really wasn't um, it was kind of one of those 'nobody else wanted to do it' kind of jobs (laughs)

I: mhm

M: So, I just kind of stepped in because I'm just, you know, I felt like it was really important. Um,

I: So you were more volunteering yourself in that situation?

M: Yes. And..and in the middle of it, the district is actually paying it, so you actually get a stipend, uh to do ..to be the coordinator, to be the science fair coordinator, and also the science chair. But I was a volunteer though, I volunteered to do that.

I: (laughs) Right! And,um..in your current role, what are some of the leadership things that you do at the university level?

M: Um, well right now..is ..is revamping the biology labs. Um, so we have a new professor coming on in the fall, um, and we also have an adjunct in the fall, so ..um, trying to...I've taken a leadership role in that regard in terms of revamping the labs and then bringing them up to speed. Um,and ..so I ..that's really the only leadership role I have I: mhm

M: at the school.

I: And how did you come into that particular role? Did you, um, were you recruited by someone, did you take it on yourself?

M: I was recruited. Um, so I was teaching adjunct for a while and um, had expressed interest in

...middle school just wasn't a good ..as much as I loved the students in that age, it just wasn't..it was really tough, I don't know, I just found it,um..not a good fit for me I guess..

I: mhm

M: Um, and I had expressed interest in teaching at a college level, um, and it ..I just really enjoy being on campus, and um, and the incoming chair..he's not the chair yet, but after summer he will, um..you know, asked me about my background, and um..I have research experience and he knew my reputation through the school district, the work I had done at the middle school especially, um, cuz I was the environmental science teacher there and, um..His wife also works for the school district,

I: mhm

M: so, it's just a..really, through reputation and that, uh, they had a need to want to revamp the labs, and knew, um that I'd worked hard in the past to develop curriculum, so it um, just kind of fit.

I: Mhm. And was it, more of informal conversation, right away?

M: Yes. Definitely.. an informal conversation, and then uh, they developed a position and advertised it, and..I..I had to apply for it obviously, and um..so, it's a new position, there isn't.. so we're kind of learning as we go..

I: mhm

M: Um, in terms of...and I haven't really touched the secondary science aspect of that, or that role yet, um, so it's just kind of been developing as we go.

I: mhm. And, when you had that conversation, what were some your reasons for thinking, yeah, this would ..this would be a great role for me? What was your motivation to move into that new position?

M: Um, well, I love teaching biology, and ..I really enjoy, um..especially freshman and non-majors biology

I: mhm

M: I don't know, I just get more ..it's just more excitement there and you have more opportunity to make a positive impact.

I: mhm

M: Um, so there's that part. But there's also..I...I really enjoy writing curriculum too, and uh, so it's been..it just seemed like a..a really good fit, and I mean, and honestly, I can't say enough good things about the program, the science education program really gave me

the ..the confidence to be able to move forward, just because of my experience there with professors and the rigor,um, I mean really, that's what's given me the most confidence.

I: The MSSE program.. M: Yeah. Definitely.

I: mhm M: yeah.

I: And I know you are still really new in this position, but what do you feel like the outcomes have been so far? Has your..do you feel like your involvement has been positive?

M: It has. Um, it's been very positive. My students..and I've tried different things, so I um, so my thesis was based on science inquiry and um, the use of inquiry to increase student engagement, um, and you know..so I could apply a lot of those methods this past semester in my classroom, um, with my biology majors, and ...it was just all, it was just, they really um, really nice anyway, (Laughs),

I: mhm

M: but they were especially excited um, especially when we were trying out these new labs uh, cuz they are inquiry based um, they just were more..I don't know, and I didn't measure it and I should have, but they just seemed more engaged um, then the other lab classes that..that were doing a more traditional lab.

I: mhm

M: Um, another positive to..again, I just credit it to that the program, the MSSE program, um.. a lot of the methods and techniques that my professors used going through the course, I ..I use in my non-majors biology classes. A lot of hands on, a lot of inquiry

based, um, just a lot of case studies, um..and I have had nothing but positive uh, student feedback

I: mhm

M: in evaluations from those classes. I mean, continuously. I: mhm

M: Um, and I..so it..overall it's just been a, other than you know, you get one stinker who doesn't like anything, but (laughs)

I: Right! (laughs)

M: but other than that, it's just been .. it's been great. It uh, I..now the faculty kind of see me as..I mean, the majority of them brought me on and they're excited about it, but there's still a few that are very traditional

I: mhm

M: Um, so it's just strictly lecture based, so..they're..um,not that they've been negative or anything, but they're just a little hesitant, just because it's new I think, and all

I: mhm

M: and that's normal, I think. I: mhm

M: Overall, it's just been extremely positive.

I: Oh, good. And you mentioned quite a bit that your experience, you feel like there's a direct correlation between your experience in the MSSE program and then how you're able to do this more inquiry based model?

M: Absolutely. Yeah, absolutely. 100%. Um, and again it was the methods and techniques that were used in the classes that I took, um, and also through just the research I..I have done.. and continue to do

I: mhm

M: Um, and I..really..I don't know, I ..it's hard to imagine..it's hard to imagine um, what I would be like had I not gone through that program (laughs). No, it was an invaluable uh, resource.

I: mhm

M: it just...really was..because when I first decided to go into teaching, Um, you know, here in South Carolina, they ..they train you for 2 weeks, and then they throw you into the classroom. And..which has its good things, but it's also very intimidating and uh, and fortunately... ..You know, so I really floundered, my first year..my second year I really floundered. Um, and then I enrolled in ..and I did a lot of research, because you had to take...in order to get your professional certification here, I'm not sure if this is true of every state, but um, cuz I didn't have an education background,

I: mhm

M: or degree, they require you to take graduate courses

I: mhm

M: And, well I might as well just go for my masters' and I did a lot of research, and Montana State was ...just really stuck out um, as being just like the...you know, just a great program, a lot of great recommendations, um..and uh, I don't know, I'm rambling now (laughs) but, sorry, but..it's just a..and I forgot where I was going with this..I apologize.

I: No, that's ok.

M: But..it..it did. It's very hard to imagine, um ..it's just that it's..I wish every teacher could actually have that kind of experience

I: mhm

M: And um, it's not because of science inquiry, um, but it was just the level of rigor and professionalism..you know, just trying out ..not being afraid to try different things.

I: mhm

M: Um, you know, whether they worked or didn't work. And ..and the tools to be able to measure that, it was a..a wonderful experience.

I: And it sounds like you went into education as like a secondary career, because I'd seen your resume, and you have a lot of other experience, and so you mentioned that, in that situation,when you already have the bachelor's degree, they give you a really brief training (laughs) and then they throw you into the classroom?

M: (Laughs) Yes. That's correct. Um, it's a 3 year program, but.. um, so you have two weeks, and in that 2 weeks..it's ..it's intense. I mean, they..uh, they put you through all of the different um, theories o education, and then um, they teach you how to write lesson plans, um...um..and unit lessons, uh, I 'm trying to think of a couple things..more kind of, you know, the day to day thing?

I: mhm

M: I guess I'd say, um..but not a really digging down, how to bring the best out of your students I: mhm

M: Um, and give them the best learning experience. Uh, and know how to differentiate, and all of that really came from the ..Montana State um, that um...really was um, I don't

know. Like I said, it's hard to imagine (laughs) teaching without having had Montana State (laughs)

I: mhm M: so..

I: and how long had you been in the classroom before you um, started the program? M: 2 years.

I: 2 years, so ..you were in the program fairly early in your career. Do you feel like that program really helped develop some of your leadership skills, and some of the things that you do now?

M: Yes, uh..absolutely. Um, well, it's certainly given me the confidence um to know ...to look for resources, um to..um, I don't know, just the confidence to try something new, and how to measure it, uh, how to evaluate it, um, to really, really focus on student learning outcomes, um.. I mean, I already had some uh, leadership um, roles in my previous careers,

I: mhm

M: as a scientist and as an editor, I: mhm

M: so, but..I mean, it's so different from education I: mhm

M: um, it's just uh, I don't know. With education, it's just really, really you put yourself out there and um, and you know, the program definitely gave me the confidence to do that.

I:mhm. What factors throughout your career as an educator have supported your development as a teacher leader?

M: Um, well..I've never been teacher of the year,um..but uh, I think the factor..its..I think the factor that's made me successful as a teacher um, in public school, was just really paying attention to my students. Um, and ..the program really, you know, forces you to do that and again, gives you the tools to measure that too.

I:mhm

M: Um, I...I don't know, it's just a ..just yeah, really understanding where my students are coming from, how to differentiated, and..um, not be afraid to change something if it's not working.

I: mhm. Do think they MSSE program provided you with any specific opportunities to develop your leadership skills? Or experiences?

M: Um, not directly. Um, no..and..and it;s not saying that they probably weren't provided. It's just...I was so busy at the time, I may not have even been aware um..of those type of opportunities.

I: mhm..Have there been any specific factors or triggers that have motivated you to take on leadership roles?

M: Yeah, uh, again, just the feedback I get from students, um, and ..uh, just seeing..oh gosh, so the last school..public school that I taught at to (XX was the principal), um, it is a title 1 school, it's considered, or was at the time considered a failing school by our state. Um, this is generational poverty, I mean, really, these are kids that came to school to eat, to be showered, we would launder their clothes

I: mmm

M: They just were not academically motivated, for very reasonable reasons. I mean, it just wasn't a priority.

I: mhm

M: Um, and we struggled so much with them. Um, and I mean, just because..you know, you just feel..feel so much for them, um...So, um..uh, ask me your question one more time, I'm sorry.

I: Mhm,, Yep. Um..have been any specific factors or triggers that motivated you to take on leadership roles.

M: Yes. Um, so, what I did see..cuz I was in the program during this time.. um, oh no, I need to go back.it's kind of complicated, but..um, I was teaching 5th grade at this particular school at the time,

I: mhm

M: and then left and went back and taught environmental science. Um, but ..um, I..I you know, I think I learned, because of the ..well I know I learned because of the program,um...I just saw that these students really responded well to hands on..um, experiences

I: mhm

M: um, that they really um, and I don't want to say distracted, but..it just seemed like the little tiny things, like um, discrepant events, um..or just a guided inquiry lesson, it just ..I don't know, it just seemed to really distract them from their day to day kind of worries and concerns

I: mhm

M: and all that other stuff at home, and they were really engaged, and so...it was just that positive..I saw their grades go up, um, we had students for the first time ever in science fair. And not only did they compete well, they won awards, they were recognized by NOAA, um, you know..we had our department of natural resources come and build greenery? with them. I mean, it was just like, um, the positive feedback from the students, but then the outside community heard about what they were doing and wanted to be part of that too.

I: mhm

M: Um, and so it's just this continual positive ...loop, that um, that really honestly, had I not been trying out these things, I don't know that uh, it really would have..of course there were other things too and other factors as well, but I mean, for my particular classes and my students I: mhm

M: that was uh, they were just so engaged (laughs) . It's just

I:mhm

M: and that was a huge trigger. It was a lot of hard work though. (laughs)

I: Yeah (both laugh). Um, and you've mentioned that in your new position, you're really going to be looking at recreating these labs and making them more of that inquiry based,

M: right

I: and then..and then part of that is also to be sharing that with other staff?

M: Yes. Yes. Um, so the ..the goal is to um, which is nice too, cuz they're..the incoming chair is very interested in inquiry, and um, and of course people use the word inquiry and mean different things, um..so ..and it just turned out that we happen to be on the same

page, which was great. Um, and so..he..I'd actually already written up the labs and submitted it to him for approval and he's really excited, and..thankfully! (laughs)

I: mhm

M: and so, and because of that, he thought, you know you should be sharing them with other faculty members and ..so this hopefully will um.. you know, our ..our university is serving those students that I taught at high school, um..so they're not like, uh..again, they're in generational poverty, they are at like.. you know, they aren't the tops of their classes, necessarily

I: mhm

M: and they're kind of the middle rung students, um...and they just have expressed..the faculty um, have just expressed that, you know, they.. our students just aren't performing academically well and they're disappointed in them. And, you know..fortunately, this incoming chair thought 'well, let's try something new and uh, and let's all try to get on the same page, and try to revamp things and get them more engaged,' so..

I: mhm

M: So it's exciting! And hopefully, it'll work! I: mhm

M: we'll see (laughs). And it's a really small school, we have less than 3,000 students. I: mhm

M: UM, and..the biology department, I think we have maybe 300 majors and that includes nursing and health promotion too.

I: mhm.

M: so it's small, which is great. Um...

I: And with your role with that, is to me, it seems like kind of a curriculum focus, where you're figuring out how to work in more inquiry. But then as far as sharing those with other staff, are you more creating the documents and then they're going to look at them, or do you have to

..with that shift in um, actual instructional practice, are you going to have to do ..you know, any sort of professional development?

M: Yeah..they've asked to do that to. Um, so..so the first..and you know, ...and it's funny because I was talking not too long ago with a colleague of mine. She teaches actually at the middle school where I use to teach. And, a lot of inquiry based, you just have to ..I hate to say it this way, but you are performing, and

I: mhm

M: and the more engaged and excited you are, the more engaged and excited your students will be. Um, so ..there's a little bit of that, so you have to coax them along a little bit, and definitely, you do have to be a little bit of a performer, so..and not everybody's ok with that. (laughs)

I: mhm

M: Especially if you're just a researcher, the last thing you want to do, you know, is that. So, there..there will be a little bit of professional development, maybe...perhaps, not this fall, because they really want me to ..and I want..to run the labs first

I: mhm

M: and make sure everything is..runs smoothly, and, um, work out any kinks or anything. And, make measurements, and um, so probably in the ..before the winter semester, or spring semester, we'll have a little professional development.

I: mhm

M: That'll be fun, so I: mhm

M: yeah, but again, it's not everybody's thing...so it's um, so that ..that will be kind of..and I've actually been reading a lot about that lately, so uh, so it will be kind of um, it will be interesting (laughs)

I: mhm! Yeah. It's a big transition for people who've done the lecture route their whole career. (laughs)

M: Yes! And that's what..you know, and that's what we ..the labs have been so far, just kind of like...but I don't know, they're just so not um..they're just the traditional recipe you know..(laughs)

I: mhm. Um, do you think that there have been through your MSSE program, any specific courses or experiences that directly supported your development as a teacher leader?

M: Absolutely. Um, certainly my thesis, um..and then, you know, I wanted to say it was a foundation of..I was just looking through my..um, the assessments and evaluation in education was very helpful. So that class was, uh, um...that one was really, ..spectacular for me. I really appreciated that. And then, um...there was another class..um, oh foundations in action research.

I: mhm

M: You know, my background was in science and science research, and I had no idea how to do (laughs) action research. I didn't know what that meant, I had an idea..but it wasn't the same idea (Laughs).

I: mhm

M: And so, I really appreciated that class, and it just really gave me a good feel for social science and the importance of that and those methods, um...And again, it just gave me the ..the confidence to do my own action research of course too, and um..so those two were really

..really ones that stand out. I: mhm

M: And the last one I'll mention too, just because I loved the way that this class was taught, I took um, an Anatomy and Physiology class, and ...I really enjoyed, uh..this teacher used a lot of case studies,

I: mhm

M: and it was a lot of fun, and I learned a lot through these case studies. So it was kind of like um, playing house, and you know..she'd give us all these symptoms and signs and then we'd be trying to figure out what was going on. So, I jus really liked that, that class

I: mhm

M: that method

I: and you mentioned your capstone as being ...um, something that supported your leadership development. How do you think that doing the capstone, doing the thesis, helped you?

M: Um, well..going through the whole process of course. Uh, just doing your own research. Um, again, and knowing how to..really..I mean really just being able to have those methods and tools to be able to evaluate your students and students' learning experience

I: mhm

M: Um, I mean that was alone was huge. I: mhm

I: Um, It sounds like a lot of what you..what you gathered from the program, had to do with, um..being able to assess your students learning, and quantifying the data a little bit.

M: mhm. Yes.

I: And then in turn that helped..helped you build confidence in your instructional practice? M: Yes. absolutely.

I: mhm. And then, in the spirit of continuous improvement, what do you think the MSSE program could do to further support leadership development in their program?

M: Huh, um..well I wish they had a PhD program (laughs)..that was similar to this one I: mhm

M: Um, I really..I don't know..and again, I'll be honest, i don't know what they offer already, and um, I was just so busy and you know, just kind of tunnel vision on what I was doing, that uh, they may have offered things and I just was, uh..you know not aware of it. First, if they are offering it, maybe just uh, more communication, I guess. Um, and again maybe they did and I just um...I feel like I just don't uh, I feel like I was in such a vacuum almost

I: mhm

M: um, because I was doing this and teaching, that I ..they may have and I just was oblivious to it.

I: Mhm

M: and so, it's hard me for me to come up with anything (laughs) I: mhm

M: that ..um,

I: What kind of things do you think they might have offered? And maybe they don't...but what are some things you think would be a big help for developing leadership?

M: um..maybe a class on uh, or classes I should say..on teaching teachers. Um, that's one thing that I've done for our school district here, um. They've actually asked me to come in on several occasions to do, just teacher workshops.

I:mhm

M: on inquiry based learning, um..and you know, it's a little intimidating with public school teachers, because again you have a wider gammut of those that are just more traditional and some..you know, are brand new or ..so, just..um, a methods/techniques to reach an audience like that.

I: mhm

M: if that makes sense.

I: mhm. Teachers are hard to teach, especially when our comfort zone is working with kids. M: Right, yeah...and so, maybe some courses that would be geared towards that.

And then, curriculum development too. Um, that's another one that uh, um, and I don't t know what the specifics would look like or any of that...

I: mhm

M: but just some..basic guidelines on ..on that.

I: Do you have anything else you' d like to share with me about your leadership roles or your experience with the program?

M: Um...I ...again, it's hard to imagine what kind of teacher I'd be without the program, it's invaluable. I've recommended it to so many people. Um, and I continue to use..I saved..well not everything...many of the things that still serve me no matter what, and I've taught 5th through college now and ..and it's pretty interesting, like, from my perspective, that the method and ways to evaluate my students work for 5th grade all the way up to my college students.

I: mhm

M: so it's very uh, it's been wonderful. So I don't have to constantly you know, have to look for things that just work for college students. I already have these resources. That's just invaluable. They have been for me.

I: mhm. Well thank you so much for taking the time to visit with me. M: Oh, sure, Kate. I wish you the best of luck.

I: I really, really appreciate it. I will....I will type up the conversation and e-mail it to you, sometimes there're things I have trouble hearing, so if there's anything I have typed wrong, just let me know.

I: OK, sure thing.

APPENDIX P

MR. NOWELL TRANSCRIPT

**APPENDIX P**

Interview with Mr. Nowell

I: Is it ok with you if I record the conversation? N: Yep, totally, yeah.

I: OK. Um, so, the first thing I'd like is just for you to tell me a little bit about your school and how students, how many staff

N: Ok. Um, I work in a private school, an independent private school, I: mhm

N: in Sun Valley, ID called community school I: mhm

N: and we're pre K through 12, and I work in the high school I: mhm

N: so 9 through 12. 9-12 I think we have 160 students there about, maybe 155 or something. And I think in the whole school, I think we have 350 something

I: mhm

N: Um, so it's a pretty small school, I don't know our staff number. I think it might be 40 or 50 full time staff.

I: How many other ...how many other science teachers are there on staff? N: Uh, in the upper school, there's 3

I: Ok.

N: And then in the middle school, they team teach, um, so every grade in the middle school has 2 teachers, and 1 is more of a science focus

I: mhm

N: and then there's one science teacher for the whole elementary school I: mhm

N: So, our whole science department, must be...I guess you'd call it 7...I think it's 7 teachers in the whole science program.

I: mhm. Sure. So would you describe your role that you have as a teacher leader...or roles. N: Um, yeah. So, I teach all the high school classes, all the...sorry, all the high school biology kind of classes,

I: mhm

N: So every 9th grader that comes in, they come through my class for introduction to biology. And then I have electives that the 11th and 12th graders can take if they want, um, and I get maybe a third or half of them back.

I: mhm

N: Um, but ..it's a really small school and we have a lot of autonomy. We don't have...we don't have state standards here, we don't have to mess with those

I: mhm

N: um, it's a really autonomous school that way, um, and so a lot of the classes and activities and things that I like to do in my classes, um, have been really self driven, and I really appreciate that. Um, I see like my time at the MSSE....Did you ever take any of those summer courses? Have you been ...

I: Yeah

N: So those were really inspiring to me and fun to me, and so I've developed some of those in the summer.

I: mhm

N: and so, I'm taking kids over to Yellowstone to talk about wildlife management over there, um, a week from tomorrow

I: mhm

N: for a week long road trip course, and so we're really lucky in my school, I think a lot of my leadership kind of ..qualities, I guess, they have to do with that autonomy

I: mhm

N: you know, creating my own kinds of courses and stuff. I really like that.

I: mhm. And then, with being able to do..like, some of the outdoor programming and the field curriculum

N: Yep

I: um, is it..things that are ...are linked to your classroom but you get to do it outside of that time?

N: We do both. I: ok

N: So, our school has a big outdoor program I: mhm

N: Um, I just got back from a week with the senior class wrapping up, we call it senior quest, down in uh Moab. And that one had no classroom curricular connection at all.

I: mhm

N: Um, just...most of the outdoor program trips here at the school don't have an academic curricular component.

I: mhm

N: Um, but some do. And it's really just up to the teacher. So, an example of that is uh, all the 9th graders in the winter, they go winter camping. They stay in snow caves, and, snowshoe around

I: mhm

N: and that's how the trip was designed, just snow camping in caves. And I like to tie in a little bit of a winter ecology component to it,

I: mhm

N: because I think that makes the trip more interesting for the kids I: mhm

N: um, and that's just my thing. Before...the teacher before me didn't do that, and the teacher after me might not.

I: mhm

N: So..it's sort of optional... I: mhm

N: the trips aren't designed to have a curricular component I: mhm

N: um, but some teachers use them as like an opportunity, so...

I: Yeah, and then with the..working in that kind of outdoor, or um, more of a field curriculum, were you..... to get into that, were you recruited by someone, or volunteering yourself?

N: Sort of, there's two different part of that. One is that every teacher at our school has to participate in that somehow,

I: mhm

N: it's part of our contracts, um, and I would say some teachers..that's not a bit part of their passion, so they just do a little bit of that,

I: mhm, yep

N: And that's been a big part of my passion here, and so there's some of us teachers that have

...a ..shown up for extra, I guess, of those outdoor trips. And we..we have some projects as far as creating more outdoor programming and stuff like that that we work on, but that's voluntary. I: mhm.

N: more or less. So, all teachers have to do some, and some teachers get excited and do more of that.

I: mhm

N: And that's the same with other things in our school that I'm not involved in, like, coaching soccer or working with the plays, you know, the theater

I: mhm

N: um, so the outdoor trips have been something that I've gravitated towards and I help a lot with, um, but, everybody does a little bit.

I: Mhm, right. And then, um..on the survey you indicated that you helped develop a summer school curriculum and a field curriculum?

N: Ok, yeah. I think its... so with that, I was probably talking a little bit about, like, this Yellowstone course,

I: mhm

N: courses that never existed before. I: mhm

N: that I got excited about, partially because of MSSE, around..things around the greater Yellowstone ecosystem

I:mhm

N:Um, so those are a direct result of MSSE, like, me getting those ideas and thinking it's so cool over there

I: mhm

N: Um, there's also some more traditional courses that have gone on here a long time..like, field biology. And those are um, three week summer school courses, that um, I teach most years. Actually, this year, I'm not going to be in town, and uh, one of my colleagues name Travis is taking over the field biology for the summer.

I: mhm

N: He's a MSSE graduate as well. I: hmm!

N: So..um, that course existed before me, and would exist without, probably in some form I: mhm

N: Um, and uh, we have a big summer school crew..a big summer school demand here at our school, because we have a lot of ski racers. So they like to take summer school courses so they can take less courses in the winter,

I: mhm

N: And so, there's a demand for summer school courses, of some sort or another. I: mhm

N: whether they're sort of ..uh, new and inventive, or just the traditional ones or not.

I: And, getting into ..making up your own curriculum..did you get pulled in to doing that by somebody, or did you just choose to do it?

N:Um, so if..this is my 8th year I think or 7th year at community school, I: mhm

N: um, so a lot of..a lot of what I do now has been, maybe projects I've been working on over the...over the years. Um, but if you were going to be a new teacher at community school, there's a lot of flexibility, like..You could either be given...uh, curriculum maps from the teacher before you

I: mhm

N: or you could do it totally your own.. I: mhm

N: Um, and so I guess it's a mix, like a ..some of the courses, I've borrowed a lot from previous teachers, um, and some of the courses have just been my own little babies that I've..uh, worked on.

I: mhm. And then, with being a... in a leadership role within your school, how you..um,..how do you work with other teachers or how do you, um, how you act in leadership role?

N: Um, yeah, well when you put it that, you know, my ...I think..I don't always consider myself, like a big leader..I think I'm a leader in my own way, it's the small things that I'm passionate about and good at, like creating these summer school courses,

I: mhm

N: I think those things, I'm really strong at, um..but, all my colleagues, I rely on so much for their strengths and things they're good at, um..so I ..I guess I would say, maybe when science department comes together, I hope that my voice important for certain things

I: mhm

N: And that I can be part of the discussion with my won strengths. And I'm lucky that we work in a place like this, where the science is department, you know, is 6 or 7 people, and so our ideas do make a difference

I: mhm

N: and do..you know, if I left, and another teacher came in, um, I think there'd be noticeable differences, and that's the same with any of my colleagues.

I: mhm

N: with..a lot of what happens at the school I think's pretty driven by, uh, just we've decided to pursue.

I: And you have that freedom in your ..in your particular situation. N: yeah, I think so.

I: Yeah, that's really nice. Um, do you feel like the things that you've done have..had a positive outcome?

N: Yeah, for the most part. I think, you know, we do self evaluations for um, for my boss for our colleagues. We do self evaluations every spring, and I was just doing mine today. And there's always things, I think, there's weaknesses that I always want to keep working on. You know, the majority, I think there's many more weaknesses than there are strengths, uh, but yeah, I think there's positive outcomes in a lot of the stuff for..for certain kids, I hope that there's positive outcomes.

I: mhm

N: And, um, and I feel good about those. And there's always things we could do better. I:

mhm

N: So..

I: mhm. How does your leadership role and ..and your involvement complement your overall goals as an educator?

N: Um, I think...one thing I feel..I feel strongly about in education is that it can be dynamic and keep changing over the years, um, and I'm really grateful to work here, where things can keep changing like that. And, so ....I think...it ..(talking to co-worker)

Oh, I'm just on this video call here..Yeah, I'll come check in though. Sorry could we...ask that question again?

I: Yeah. How do you think your involvement in the leadership roles you've taken on has complemented your overall goals as an educator?

N: Oh, ok. Well, I think that it's good for me to work in a place where, um, where I can pursue passions and a develop classes and things like that, that um, that's good. I think that fills my goals that education should be dynamic and interesting and keep changing

I: mhm. Um, and so I'm grateful that some of the things that I feel strong with, like creating the summer school courses, for instance I: mhm

N: that they 're valued here and that there's a place for them here, and things like that. I: mhm

N: Um, you know a lot of the, maybe leadership styles that I developed or things that I learned at MSSE, maybe those others schools where they wouldn't have such a obvious connection, or maybe I wouldn't be able to use them as much

I: mhm

N: But I've felt really lucky, like a lot of that stuff's translated really well to here.

I: And when you say a lot of the ..the leadership things you learned, are you thinking of things you learned in a lot of the field courses?

N: Yeah, you know, a lot of..when you mention the leadership in this context, a lot of it seems to me like, uh, just like a clarity of ..purpose maybe?

I: mhm

N: or clear vision, like ...I'm lucky enough that courses that I took at MSSE, the field courses mostly, um, were so inspiring and I realized how fun and interesting they were. And I had..I work in a place where I can try and do some of that same stuff here,

I: mhm

N: So..that has all worked really well. I: mhm

N: Yeah

I: Do think your leadership has progressed over your career?

N: (to co-worker) Oh, if you need a bunch of those chairs Phill, there's a whole...um, pile, I can help you in a few minutes. Well....yeah, could you ask that one again, sorry?

I: Mhm. Do you think your involvement in leadership has progressed over the length of your teaching career?

N: Yeah, I think so, I think..um, as we all learn things, and get, just more competent, and develop more skills with teaching

I: mhm

N: that, uh, leadership just builds in small increments I: mhm

N: and so, I think...you know, it's still..I'm very much, like, in the beginning stages of teaching in that way, but I think every year, that things go well that I learn and build on things like that. I: mhm

N: it all contributes to that.

I: And do you feel that MSSE program uh, contributed or had an impact on the progression of building those skills to be a leaders?

N: Yeah, I think so. And, I think probably in two ways. The online courses, the EDSCI courses I: mhm

N: the education courses, those really forced me to like ... develop the um, like the small day to day skills like assessment and things like that are really important that I'd been kind of flailing on, so those were like, really concrete ways, and my teaching methodologies got stronger.

I: mhm

N: and then also just, the biggest thing for me has been the passion of those summer courses and the field courses.

I: mhm

N: and how much I learned, and how much I'd like to keep sharing with kids.

Um, so yeah, I think there was those two ways for me in that course.

I: mhm. Do you think that your completion in the ...or your participation in the program um..and you kind of answered this one in what you just said, but I'm going to ask the question anyway. Do you think it impacted your ability to act as an effective science teacher leaders?

N: Yeah, I hope so. Yeah, kind of cuz of the same way, there was some practical things that made my teaching stronger, but there was also...some revival of passion and excitement for learning, and I think both of those are really important for a teacher

I: mhm

N: and I think leadership can come out in a lot of ways with colleagues, and ...at a school, and I think one way is just being excited about teaching.

I: absolutely

N: so...that for sure has been a strong part of it.

I: mhm. What factors do you think, or if there were any specific factors or triggers..have motivated you to take on leadership roles or to pursue leadership?

N: Uh, building up...I guess a little bit, building up of confidence has been a part of that.

I: mhm

N: You know, when I started teaching, I was 22, and so...just getting slightly more confident, and uh, feeling stronger in things, I think that's been the biggest part of it.

Just...time.

I: time..

N: and confidence, yeah.

I: mhm. Do you feel like the MSSE program contributed in any way to that building of confidence?

N: Yeah. I think, um, going through any kind of masters' program and really rigorously looking at one's teaching is pretty important.

I: mhm

N: um, because, every few years...it's probably different for different people, but maybe 4 or 5 or 6 or 7 years, uh, it'd be easy to sort of like...I guess you'd need a boost again.

I: mhm

N: So, going..enrolling in a masters' program is a pretty distinct boost, you know, that..uh, get things lined up again, sort of re..re-build the foundation. Uh, yeah, that's it, for sure.

I: mhm

N: and meeting other teachers, you know. I've been a..I think it's really easy in a school to get

...like I get so tight in my community, my colleagues, but our science department's only 6 or 7 people, and so..getting to move beyond that, to hang out with the MSSE cohort, whatever that was, 150 people? That was pretty powerful, cuz I met so many other teachers with so many other good ideas, so...

I: mhm. That collaboration.. N: yeah

I: mhm. Um, was there a specific course or a certain experience in the program your development as a teacher leader?

N: Um, I think the field courses, all of them. I think of them all as one big package, so those were really important for me, um, and ...then maybe, I'd have to go back and look, but one of the early EDSCI courses, 504 or 505,

I: mhm

N: where we started working on our thesis, but they were just practicing different kinds of assessment

I: mhm

N: those were really meaningful to me, um..For a while, when we started the thesis courses, I was sort bogged down in my own little head, my own little world, working on the thesis. And..what ended up being the best part of those, whatever that was, maybe 506 or 509? I: mhm

N: What ended up being the best part of those was looking at other people's thesis work.

I: mhm

N: and getting so many cool ideas. Cuz my thesis, I ended up being sort of like, it didn't feel that strong, it felt like flew all around, and kind of ..had a soft landing.

I: (laughs)

N: But some of the other people's thesis work that we were sharing with, on the chat rooms and stuff,

I: mhm

N: it was really, really fun..um, really fun for me to learn about, so..

I: mhm. So you enjoyed that learning from other teachers part as well. N: Yeah.

I: mhm. Um..and..it sounds like most of your feedback of the program is really positive, um, but in the spirit of continuous improvement, what do you think the MSSE program could do to further support leadership development?

N: Um, that's a..that's an interesting question. You know, I think leadership means so many different things,

I: mhm

N: like in this context, like you and I are talking about, with my role here at the school, I think leadership for me, has just been doing a good job with what's on my plate and being a good member of the science team,

I: mhm

N: but, maybe leadership for someone else means something more obvious, like becoming a...a school head or principal or something. So, I think it can mean a lot of different things, I think MSSE could probably serve a lot of different kinds of people,

I: mhm

N: people that do just want to be a..keep being a good science teacher, or if they wanted to take on a more curricular role in curriculum development, or science department chair or something, I don't know. I think MSSE serves all those people pretty well,

I: mhm

N: maybe ...I hadn't thought of this before, but maybe the program could ask people what their leadership goals are.

I: mhm

N: in the courses, like as a self evaluation, um, so that they've thought about it during the program.

I: mhm

N: That would serve some people well. I: mhm

N: Yeah..

I: Is there anything else that you'd like to share with me..um, about your leadership, about the program..

N: Um, I think I would just say... that teaching is such a collaborative thing, you know, working with other teachers at MSSE and the staff at MSSE, and my colleagues are coming in..keep coming in and stealing chairs for some reason.

I: (laughs)

N: So, I mean, I think leadership's an interesting word anyway, or an interesting idea.

I: mhm

N: And I feel pretty humbled, a lot by teaching, so ..I hope something that I work on is helpful to somebody.

I: mhm

N: Where I really think, like, the leadership, the strength of leadership is just when we're all working together um..so

I: mhm N: yeah.

I: I really appreciate you taking the...the time to visit with me. N: Oh, thank you.

I: Yeah, I will type up the conversation we've had, and I'll e-mail that to you in the next couple of days, and then if you want to just read through it and make sure I heard things correctly, and N: OK, cool

I: And then, I'll be checking in with a....a principal or supervisor and trying to make contact with them too, so

N: Ok, yeah thank you Kate, thank you for your time.

I: Thank you! Have a great rest of the school year and enjoy your summer. N: OK, thank you, you too.

I: mhm, bye

N: bye