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The Prevalence of Peter Senge's Five Disciplines of a Learning Organization in a Rural High School's Professional Development

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THE PREVALENCE OF PETER SENGE'S FIVE DISCIPLINES OF A LEARNING ORGANIZATION IN A RURAL HIGH SCHOOL'S PROFESSIONAL DEVELOPMENT

by

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ABSTRACT

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This qualitative case study used mixed methods data collection to research the prevalence of Senge's (2006) five disciplines of a learning organization in a rural high school's professional development. It also examined how the presence or absence of the five disciplines impacted teachers' perceptions of professional development. The study included participants at a Midwestern rural high school and focused on elite interviews with the principal and professional development coordinators, a focus group with eight teachers, and survey results from fifty percent (50%) of the high school teaching staff.

Findings indicated that the discipline of team learning is most prevalent in professional development at the high school, with shared vision being the least prevalent discipline. Though team learning also had an impact on teachers' positive perception of professional development, no clear relationship existed between the presence or absence of the remaining four disciplines (shared vision, mental models, personal mastery, and systems thinking) and teachers' perceptions. Despite the strong evidence of team learning overall across the three data collection methods, teachers in single-member departments experienced a much lower prevalence of the discipline which is consistent with other studies of rural education. In addition, the data indicated that different demographic subgroups of teachers experience the five disciplines uniquely. The study concluded that Senge's (2006) learning organization is a worthy framework around which rural schools can focus their professional development.

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CHAPTER ONE

Introduction

Chapter Overview

This chapter provides an introduction to the research questions and topics. It begins with a discussion of the personal significance of the three main topics of the research question: rural schools, professional development, and Senge's (2006) five disciplines of a learning organization. The primary research question is as follows: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? The secondary research question asks the following: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? Next, personal, practical, and intellectual goals for the study are identified. Then, the chapter establishes a connection between my research and Ernest Boyer's (1990) scholarship of teaching. The chapter concludes with an overview of the conceptual framework that includes a brief explanation of Senge's (2006) five disciplines, the need for strong professional development, and the importance of research in rural education settings.

Personal Significance

Rural schools. I remember the day I got hired for my first "real" job. I had been applying at schools in the nearby metro area, but without experience I was not having much luck. With each day that passed during that first summer after college, my job-

search area expanded. Then, I was offered a job in a rural town to which I had never been until my interview. I accepted as soon as the offer was presented because I was going to be a first-year teacher and was happy to have any job. Then, I called my college roommate and told her where I was hired because she drove through the town on her way to campus from her hometown. The first thing she said was, "You'll be fine there. They have a Hardee's and a Dairy Queen." She knew my fondness for fast food, and that I had never lived anywhere without plenty of options for it! Nonetheless, I was nervous.

I grew up in a college town with just over 15,000 people and nearly an additional 10,000 during the college school year. Though it was certainly not a metropolis, it was over five times as large as the town in which I was hired. I was sure I would not stay at my first job very long. I would get my tenure after three years and move on to a district much larger and closer to where I thought I wanted to be. That was over a decade ago, and I have no intentions of leaving. Almost three years ago, I purchased my first house in the area, and it is completely rural with only satellite internet available and the inability to see any of my neighbors. I have become a part of the rural community. With the acceptance I have experienced into this community, I have also come to understand the triumphs and challenges of living in a rural community and working in a rural school.

Many of my experiences working in a rural school have been positive. Due to the small size of seven teachers, I have great autonomy within our English department. I am able to make changes to the curriculum for my classes without needing several levels of approval. There is also a strong sense of community among the staff because many us live in or near the same town as the school where we work. As a result, we run into each other at restaurants and the grocery store. Living in community with each other has

caused me to develop very strong friendships with my colleagues. Working in a small, rural school also provides several opportunities to broaden professional experience very quickly. Committee membership, leadership on those committees, and coaching and advising positions are always available. It is difficult to find a teacher on our staff who does not do something "extra" in addition to his or her teaching duties. All of these opportunities allow teachers to expand their professional knowledge by learning about other aspects of education, building leadership skills, or deepening connections with parents, community members, and staff. I have described our school as being a great "résumé builder" for some younger teachers who are not sure a small, rural school is where they want to spend their entire career.

Despite the bonuses, there are also some drawbacks to working in a rural area. First, it is difficult to prepare students for life after high school when there are a few students every year who have never been out of the county. Their world view is limited to a radius of a few miles around our school. Therefore, it is up to our teachers to provide them with a sense of the greater world through our curriculum and other experiences the school provides. Another contributing factor to this opportunity gap is the lack of broadband internet access to many of our students. We are a poor county, but even if the families of our students were able to afford it, broadband internet simply is not available at many of the homes in our school district. In the three places I have lived during my career, I have only had access to high-speed internet at one of them. This provides a challenge when assigning work for students. I must be careful that nothing I assign will require students to use the internet at home. One other challenge to working in a rural school has to do with the building itself. It is very old. We have tried several times over

the past few years to pass a referendum for a new building. However, we have been unsuccessful. This is due to several factors that are mostly unique to rural areas. First, we have a much smaller tax base than many larger districts. Second, our rural county has a high poverty rate. Third, our tax base has numerous farmers, and farms are taxed at a very high rate on building referenda. Finally, many people who still live in the community graduated from the school and are very nostalgic about the current building. Over the years, the pros and cons of working in a rural school have taught me that rural education has many characteristics that make it unique. That uniqueness deserves attention.

Professional development. My journey to becoming part of this rural community has been meaningful, but it is not the only journey on which I have embarked during my career. Currently, I am the staff development coordinator for our district. At the time of this writing, I will be beginning my fifth year in this role. While I still teach some classes, I have time in my daily schedule for planning district-wide professional development (PD). I was the only person to apply for the position, and I grow more excited about it every year.

My professional development journey began during my fourth year of teaching. I offered to be the English department's representative on the high school staff development committee which would include attending the monthly meetings, providing input at the meetings, and voting on decisions. At the first meeting, the district coordinator began by stating we needed to select a chair for the high school committee. Many faces looked down in their laps to avoid being chosen, and I was one of them. Then, my principal at the time nominated me for the position. Thus, from my very first

meeting, I have held a leadership role on our professional development team. What I did not expect, however, was that I would grow to love planning and organizing our PD as much as I do now. Our former district coordinator was a great mentor for me. She taught me everything I needed to know about planning and executing an in-district professional development activity and let me experiment with my own ideas as well. From the first day, she built confidence in me to believe I could be successful in that leadership role. When she retired, I was nervous, but I felt prepared to take on the district position.

Though I love professional development and take my responsibility to plan learning opportunities for our staff very seriously, the position has plenty of obstacles. First, as previously mentioned, our teachers have ample opportunities to be involved in extracurricular activities. While this is a great thing for many reasons, it makes planning PD difficult. Professional development time is mostly limited to before school since our teachers must be present at after-school extracurricular practices. Also, because they are taking on these extra responsibilities, it leaves less time to focus on improving their teaching. This is not only true of our teachers who are coaches and advisors. Because we are a small school, we have one Spanish teacher, one German teacher, one business teacher, one agriculture teacher, and there are more similar examples. Thus, our German teacher prepares for German I, German II, German III, and German IV every day. In one semester, our agriculture teacher will prepare for the following classes each day: 7th grade agriculture, 8th grade agriculture, large animal science, fishing and aquatics, and Minnesota natural resources. With teachers prepping for so many classes, it is understandably difficult for them to devote much time to PD activities.

Another consideration I must take into account when planning professional development involves the professional readiness of our teaching staff. As a rural district, there are certain positions for which we often do not receive more than one applicant. Many times, this is a first-year teacher. Though we have hired fantastic first-year teachers in the past, their depth of knowledge about the teaching profession is usually not going to be at the same level as someone with experience. When planning learning opportunities, the professional knowledge of the participants must be acknowledged. In addition, we have had multiple Tier 1 teachers on our teaching staff, who are those who have experience with the content but lack a teaching license and education coursework. These teachers must be provided with teaching basics in our professional development, so they have time to learn the vernacular and necessary skills such as classroom management. In addition to Tier 1 teachers, we have had multiple teachers with out-of-field permissions, who are those with teaching licenses but teaching classes outside of their licensure content area. Again, their needs must be recognized when planning PD activities. As the district professional development coordinator, I try to be mindful of the needs of all of our teachers, but finding a "magic bullet" that will apply to everyone is both impossible and unrealistic.

Senge's five disciplines. In the very first course of our Ed. D. program, we read *The Fifth Discipline* by Peter Senge (2006). In the book, Senge discusses five disciplines that must be developed in the members of an organization in order for it to become more "learningful." While the text was interesting, I was just getting my feet wet in learning how to be a doctoral student and did not apply the content to my professional roles. A couple years later, I was attending a professional development session out of the district

with the rest of our district's instructional leadership team. As the presenters shared research applicable to our work in schools, they highlighted Senge's five disciplines of a learning organization. While at the session, I pulled up my previous doctoral assignments based on Senge and showed my colleagues. Our curriculum and assessment coordinator was drawn to the work and soon purchased a copy of the book for herself. As the next school year approached and she planned the data retreats for each department, she asked if I would be willing to share information about the five disciplines at the retreats. She felt the disciplines had strong connections to the curriculum alignment work being done. While preparing for these sessions, I began thinking about Senge's work being applicable in all aspects of a school, including professional development. Senge's (2006) concept of a learning organization is one where "people are continually learning how to learn together" (p. 3). The unique characteristics of rural schools and the many considerations that must be made for teacher professional development lead to the idea of developing a staff that learns how to learn together; an idea that deserves further exploration.

Goals

Maxwell (2013) asserts that identifying the personal, practical, and intellectual goals of a research study are an important part of the research design. Doing so allows the researcher to make sure the study is worth doing and justify that the conclusions matter. The first of the three types of goals is a personal goal that motivates the researcher to complete the study, but is not necessarily important to others. A personal goal for me in this study is learning more about how to make professional development meaningful. Professional development is a passion of mine and I am always looking for ways to do my job better. The second type of goal is a practical goal which Maxwell (2013) explains

is focused on accomplishing something such as "meeting some need, changing some situation, or achieving some objective" (p. 28). A practical goal for this research is determining the current reality of a rural high school's progress toward becoming a learning organization. This information is helpful as the research site plans future professional development that leads to school-wide improvements through continual learning. The third goal is an intellectual goal. Along with understanding something or acquiring more insight, intellectual goals answer "some question that previous research has not adequately addressed" (Maxwell, 2013, p. 28). A question that has not been addressed in prior studies involves how the five disciplines occur within the professional development of a rural high school. Without planning for their implementation, are the disciplines still present? These goals and the research questions are the main drivers of this study.

One final motivating factor is the opportunity to engage in Boyer's scholarship of teaching. Boyer (1990) explains this scholarship by asserting that teachers "must, above all, be well informed, and steeped in the knowledge of their fields" (p. 23). When teachers participate in professional development activities, they are gaining more knowledge about their fields: content area knowledge and instructional strategies. Boyer (1990) acknowledges that good teachers are also learners. Through professional development, teachers are learning. In addition, this study will examine evidence of the school being a learning organization in which everyone learns to learn together. By researching the way in which teachers at a rural school learn, I hope to contribute to the scholarship that "both educates and entices future scholars" (Boyer, 1990, p. 23).

Conceptual Framework

Senge and professional development. Senge's (2006) concept of a learning organization is used as a foundation from which to examine the characteristics of professional development in a rural high school. Though Senge's original work does not focus specifically on schools, he has since adapted his work for an educational audience. Education leaders are now "moving toward approaches that consider schools as 'organic organizations' that are capable of learning and continuous improvement" (Thornton, Shepperson, & Canavero, 2007, p. 48). Other researchers have adjusted the definitions of the five disciplines of a learning organization to a school context. In his research, Park (2008) formulated the definitions in Figure 1 for each of the disciplines. Each discipline is explained more in depth in Chapter Two.

Figure 1
Park's (2008) Definitions of the Five Disciplines for Schools

Discipline	Definition
Personal Mastery	At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.
Mental Models	At the school, teachers continually reflect on assumptions about schooling; openly dialogue, share views and develop knowledge about each other's assumptions; and engage in their own work with flexibility.
Shared Vision	Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.
Team Learning	At the school, various group or team activities are encouraged to address schooling issues or teacher's professional work; teachers become committed to, skilled at, and involved in collaborative work.
Systems Thinking	Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.

As previously mentioned, the study uses the five disciplines as a framework for investigating the professional development of a rural high school. Therefore, it is necessary to understand the reality of professional development according to existing research. Darling-Hammond (2010) states that professional development of teachers is the area of education in which the United States is the most behind. In contrast, the top-ranking countries have structures in place that support professional development on a much greater scale than the US. Teachers in these nations have 15-25 hours per week for preparation and collaboration with peers. In addition, they receive "2 to 4 weeks of

professional learning time annually to attend institutes and seminars, visit other schools and classrooms, conduct action research and lesson study, and participate in school retreats" (p. 198). Fullan, Hill, and Crévola (2006) concur that our PD efforts fall short:

> Despite scads of money, the use of the best expertise to design and put into place strategies most likely to succeed, and the political will to stay the course, no one has yet cracked the classroom code leading to better instruction for all. (p. 12)

Not only do Fullan et al. (2006) highlight the need for better professional development, they underscore the need for professional development in the first place. They argue that the classrooms of today look very similar to the classrooms of decades ago and that teaching has remained the same over generations. Therefore, our current instructional strategies are not equipped to meet the needs of today's students. Darling-Hammond (2010) draws the connection that "nations that have steeply improved their students' achievement, such as Finland, Korea, Singapore, and others, attribute much of their success to their focused investments in teacher preparation and development" (p. 194). With the need for strong professional development identified, how Senge's (2006) five disciplines can meet the needs of today's teachers can be examined.

Park's (2008) definition of personal mastery explains that each teacher must be engaged in continuous learning and improvement. However, without the structures in place to allow time for teachers to delve into their own professional learning, some individuals shut down and "become impermeable to better ideas" (Darling-Hammond, 2010, p. 196). Fullan et al. (2006) agree that ongoing learning for every teacher is necessary for significant improvement to occur.

When fostering the discipline of mental models, another of the five disciplines, teachers are continually examining their own and their colleagues' assumptions about education (Park, 2008). When this examination of assumptions is not in place, Darling-Hammond (2010) warns that teachers form incorrect conclusions about what is happening in their classrooms and how to resolve it. They need to examine the assumptions that are informing their decisions in the classroom. Elmore, a critic of school reform efforts, asserts that reforms often fail because "they lack agreement and coherence around expectations for student learning" (as cited in Fullan et al., 2006, p. 6). In other words, the reforms are unsuccessful because teachers have not brought their mental models about student learning to the surface in order to examine them.

Park (2008) points out that shared vision, the next of the disciplines, occurs when schools have gone through a process of building a shared commitment to a goal. When a democratic, decision-making process has been used to achieve buy-in from teachers, parents, and students, everyone works harder (Darling-Hammond, 2010). Fullan et al. (2006) describe a study in which school reforms neglected to make any significant changes in student learning. They conclude that there were strong professional development opportunities for individual teachers, but no overarching umbrella to pull them all together. Good ideas were present, but had no follow-through. Without shared vision, there was a lack of focus for the learning taking place.

Team learning is the next of the five disciplines. It is characterized by the collaboration that takes place among teachers to address school issues (Park, 2008). Darling-Hammond (2010) reports that collaboration is a common element among schools with high student achievement. Top-ranked schools provide time for teachers to co-plan

lessons, analyze student work together, and discuss student needs. The benefits of collaboration may be more easily seen in smaller schools with more collegial environments. In these settings, "teachers generate greater collective responsibility for school improvement and student learning" (Darling-Hammond, 2010, p. 261).

The final discipline, systems thinking, is developed when teachers consider how their work impacts the school organization and vice versa (Park, 2008). Fullan et al. (2006) believe that any improvements in student learning must begin with a focus on instructional systems as a whole, avoiding disconnected plans. They claim that if a school organization is not aligned internally, "it simply does not have the capacity to improve" (p. 8). Systems thinking also involves the process of change. In order to create change, Darling-Hammond (2010) says that well-designed professional development opportunities of 49 hours or more over a period of six to twelve months is necessary for gains in student learning. Planning this depth of professional development requires a systems thinking skill set.

Senge reports that he was inspired by an innovative principal who said "her primary job was creating an environment for teachers to continually learn. She said she was convinced that if teachers were continually learning, kids would be continually learning" (as cited in Sparks, 2001, p. 47). Thornton et al. (2007) explain that all five disciplines are necessary for organizational learning. Thus, each of the disciplines must be fostered in order for the school to learn as a unit. These sources indicate that improved professional development based on the five disciplines of Senge's (2006) learning organization is needed to improve student learning in the United States.

Rural education research. The previous discussion reports findings on professional development in the United States in relation to Senge's (2006) five disciplines of a learning organization. However, the research questions specifically address a rural context. Therefore, as part of the conceptual framework, it is important to explore the landscape of rural education research. Though many definitions of rural exist, Donehower (2014) explains, "'Rural' is typically a felt term in the USA, rather than a technical one. It is associated with small populations and isolating geography, but also with conservative politics, an agricultural economy, ethnic homogeneity and an insular culture" (p. 168). This serves as an accurate description for the rural community in which the research site is located. Whether or not it was important to identify the setting as rural was considered. Corbett and White (2014), however, declare its importance because of the way rural is both similar to and different from the growing urbanized world. They contest that there is an urgent need to examine the dominance of metropolitan-biased research methodologies that portray rural as deficient, rather than different. Therefore, honoring the rural locale of the research site is an important distinction to make in this research.

In choosing to highlight the rural setting of the study, a rural standpoint is claimed. Roberts (2014) explains, "A rural standpoint refers to approaching my research from a position that rural people and communities really matter" (p. 136). Not only is it important from a research lens, but it is also critical to appreciate the rural setting as it is an important element of the professional lives of the teachers who will be participating in the study (Roberts, 2014). Roberts cautions, though, that rural researchers must accept two roles. First, they must draw conclusions about the rural from the research. Second,

they must simultaneously avoid "limiting notions of rurality and romanticizing the rural" (p. 144). In summary, doing research in a rural setting is both important to contribute to the overall understanding of rural and requires specific considerations to accurately represent the conclusions.

Chapter Summary

My professional experience has seen the convergence of the following three concepts: rural schools, professional development, and Senge's five disciplines of a learning organization. As such, I agree with rural researcher Michael Corbett in Bartholomaeus, Halsey, and Corbett (2014) as he explains, "The research questions which have interested me have arisen from dilemmas I faced as a teacher in communities that were faced by multiple challenges" (p. 59). However, none of these topics are unique to my workplace. I am able to observe their interplay in my own school, but the research examines how the three combine in another rural school.

This chapter provides an overview of the research questions and topics. The primary research question asks the following: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? The secondary research question is as follows: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The chapter also includes my personal rationale for the study. The background of my experience with rural schools, professional development, and Senge's (2006) five disciplines of a learning organization is explained. Then, goals for the study are identified. Next, this research study is connected to Boyer's (1990) scholarship of

teaching by stressing that teachers learn more about their fields through professional development, and, thus, become stronger teachers. Finally, the conceptual framework is described. First, Senge's (2006) five disciplines of a learning organization is applied to schools using Park's (2008) definitions. Then, the need for stronger professional development in the United States is noted and linkages between the five disciplines and professional development are identified. Last, the importance of both acknowledging and honoring the rural setting of the research are highlighted. The following chapter examines the existing research on rural education, professional development, and Senge's (2006) five disciplines.

CHAPTER TWO

Literature Review

Chapter Overview

This chapter summarizes current understandings about professional development, rural education in the United States, the professional development that teachers in rural schools receive, and the application of Peter Senge's five disciplines of learning organizations in schools. The dissertation research question is as follows: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? The secondary research question asks the following: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school?

The main research question has three significant foundations: professional development, rural schools, and Peter Senge's five disciplines of a learning organization. Thus, the review of literature explores aspects of all three areas. The first section focuses on rural schools. It begins with a brief history of rural education in the United States and its current status followed by a discussion on the differences between rural and urban schools. Then, the review looks at the problem of defining rural and the implications the problem has for conducting research in rural settings. This background leads to a brief synopsis of characteristics of rural education research. Due to the rural context of the

research, it is imperative to obtain a deep understanding of the history, characteristics, and current research regarding rural schools.

The second section of the literature review provides an overview of Senge's (2006) five disciplines of a learning organization. The five disciplines of personal mastery, mental models, shared vision, team learning, and systems thinking are defined and explained.

The next section focuses on professional development (PD) for teachers, referred to as staff development in some of the literature. It begins with an overview of what professional development is, what activities constitute professional development, and its importance to the profession. Next, the review includes facts about the professional development currently experienced by teachers in the United States. Five models of staff development organized by Sparks & Loucks-Horsley (1989) are explained with short descriptions of each model's components and outcomes. Following the discussion of the five models, five features of effective professional development are defined as they were first proposed by Garet, Porter, Desimone, Birman, & Yoon (2001) and later refined by Desimone (2009). Next, Smith's (2010) framework, which combines several theories of effective professional development, is explained followed by a description of the following methods of PD: workshop, coaching, professional learning communities, and action research. After looking at models, features, and methods of PD, the section concludes with factors affecting the implementation of PD into classroom practice and an explanation of Guskey's (2000) framework for professional development evaluation.

The fourth section briefly discusses professional development for secondary teachers as they are the subject of the research question. The section points out what

works for secondary teachers participating in PD and some of the challenges highlighted in the literature.

The next section of the literature review pulls together the foundations of professional development and rural schools and summarizes available literature on PD in rural schools. To begin, the need for PD for rural teachers is explained. Next, challenges of providing PD in rural schools are identified. The success of collaboration as a component of PD in rural schools is then discussed followed by the unique needs rural schools have in regard to professional development.

The final section of the literature review discusses the available literature regarding how Senge's five disciplines have been integrated into professional development. First, an introduction explains why a learning organization orientation is important for schools to adopt. Then, the implications of each discipline for professional development are addressed. The contents of this chapter provide the necessary background for understanding the fundamental components of the primary and secondary research questions.

Rural Schools

History of rural education in the United States. A common image that comes to mind when one thinks of rural education is the one room schoolhouse. In fact, this is an accurate image of New England and midwestern schools in the 1800s and into the 1900s when America was a rural nation. Tieken (2014) describes these early school buildings as a simple square or rectangle with long windows on only one or two sides. They were located near the center of the district the school served so that no student would have to walk more than approximately two and a half miles to get to school

(Wonnell, 1994). The building itself was important to rural communities and served as a meeting place for civic, religious, and recreational gatherings. Teachers in these schools were mostly women. While the main goal of early rural schools was to prepare students for life in the community, teachers were also responsible for cleaning the schoolhouse, tending to its fireplace, and caring for injuries children may have sustained while there (Tieken, 2014; Wonnell, 1994). Up to eight grades would be held in the same schoolhouse. One at a time, a grade level of students would come forward to sit on a long bench in the front of the schoolhouse to receive their lesson. The remaining students would work on their assignments in their desks until it was time for their class to receive a lesson (Jump, 1994). The school year followed an agrarian calendar, and students attended school in summer and winter, but not during the planting and harvesting seasons (Tieken, 2014).

Though the one-room schoolhouse model of education sufficed for many years, the reputation of rurality, defined as a condition of place-based domesticity shared by people who live in areas recognized as rural, began to change after the industrial revolution (Chigbu, 2013). Manufacturing became the central focus of the nation's economy, and thus urban interests usurped rural ones in national politics. After the Civil War, magazines, newspapers, and literature portrayed the backwardness of rural living. As the twentieth century began, the demographics of America's rural communities were changing due to small farms becoming large commercial farms tenanted by immigrants while rural youth migrated to the cities for manufacturing work. With an increased importance placed on city life, reformers worried that the decreasing rural population and changing demographics indicated a problem in rural communities that was a threat to all

of America. These reformers quickly focused on rural schools by insinuating that they were the source of the "rural problem" (Tieken, 2014).

In 1898, the Committee of Twelve on Rural Schools, appointed by the National Council of Education, released a report which concluded that American rural schools were inefficient, lacking standards, absent of state oversight, in need of intelligent supervision, and being served by untrained, immature teachers (National Education Association of the United States, 1898). Stanford professor, Ellwood Cubberley, echoed the Committee of Twelve's findings in *Rural Life and Education: A Study of the Rural-School Problem as a Phase of the Rural-Life Problem* (1914). Around the same time, a survey revealed that over half of the rural teachers in Nebraska were immigrants. This caused concern that the immigrant teachers would be unable to foster a unified American spirit at rural schools (Committee of Graduate School of Education, 1919). As a result of these reports, reformers agreed that the best way to improve rural schools was consolidation. Consequently, thousands of schools were closed (Tieken, 2014).

Rural schools today. Although many rural communities lost their local schools during consolidation, the rural schools that survived are an integral part of the American education system today. The U.S. Department of Education National Center for Education Statistics (2013) reports that over 9 million elementary and secondary students attend a rural public school which equates to approximately one fifth of the country's students (Tieken, 2014; Johnson, Showalter, Klein, & Lester, 2014). Nationally, rural public schools make up around one third of all public schools (U.S. Department of Education, 2013; Johnson et al., 2014). In 15 states, however, over half of the schools are

rural (Johnson et al., 2014). This is true for Minnesota where the research takes place (U.S. Department of Education, 2013).

As in the early days of rural schools, today's rural schools are strongly tied to their communities. High school game nights are social events for everyone in town, not just parents and students. In fact, most school activities in which kids take part are open to the community (Tieken, 2014). While many value the close-knit aspects of rural schools and communities, some students believe they are not given a chance to show their teachers who they are. As one student explained, "They know your family; they know how you're going to be before you even come to class, before you start school" (Tieken, 2014, p. 57). And while students may wish there was slightly more anonymity, teachers must also be comfortable with everyone knowing their business. Teachers with longer careers in rural schools are more likely to be comfortable with, or at least tolerant of feeling like their performance is an appropriate topic of conversation in the community (Miller, 2012). In addition to the previous examples, there are several other factors that make rural schools unique from nonrural schools.

Rural vs. nonrural. Despite obvious differences, rural districts are tasked with providing the same opportunities and producing the same outcomes as nonrural districts (Tieken, 2014). The differences between rural and nonrural districts begin in the communities of which they are a part. This section describes research identifying differences between rural and nonrural communities, schools, and student achievement within the schools.

***Rural and nonrural communities*.** Differing demographics create a discrepancy between rural and nonrural locations. Rural communities overall have higher poverty

rates than nonrural districts (Stewart & Matthews, 2015; Tieken, 2014). However, they also have lower income inequality (Tieken, 2014). Rural communities also experience a lower concentration of minorities (Roscigno, 2001). Over 70% of students in rural schools are white, whereas just over 50% of public school students nationwide are white (U.S. Department of Education, 2013). Rural communities experience greater housing values due to their location away from metropolitan areas and lower income rates (Tieken, 2014). Unfortunately, the economic status of rural areas sometimes leads to a "brain drain," or a situation "where those that have the ability to leave often do, which further handicaps the ability of rural areas to adapt to changing times" (Gagnon & Mattingly, 2015, p. 3). While there are several disparities between rural and nonrural communities, the comparisons carry into the schools as well.

Rural and nonrural schools. The tax base from which rural schools are funded is much lower than in nonrural areas because of the economic factors affecting rural communities (Roscigno, 2001; Stewart & Matthews, 2015; Tieken, 2014). Per pupil, rural districts receive almost $700 less per year than nonrural districts (Roscigno, 2001). Some situations that urban schools and teachers experience are reversed in rural schools. Rural districts experience decreasing enrollment, as opposed to the overcrowding facing urban schools. In addition, rural school teachers know students and families well, whereas urban teachers may struggle to get to know their students (Tieken, 2014). One explanation for this familiarity is the lower student to teacher ratios in rural districts (Roscigno, 2001).

Rural and nonrural student achievement. When student achievement data is compared between rural and nonrural districts, results are mixed. For over 30 years, rural

students have had lower performance in math and reading on the ACT and SAT compared to nonrural students. However, the statistics are better for rural students when suburban students are taken out of the equation. Rural public schools' students perform better on the National Assessment of Educational Progress (NAEP) than students from schools in cities and towns. Rural schools also have higher graduation rates than peers in city and town districts (U.S. Department of Education, 2013). However, when suburban students are added to nonrural districts' statistics, rural schools have higher dropout rates (Roscigno, 2001). Interestingly, in an Illinois study of middle schoolers' performance on state standardized tests, rural students achieved as well or higher than peers in metropolitan districts, unless the rural school was not adjacent to a metropolitan area (Beck & Shoffstall, 2005). That study indicates that there is a difference in rural schools depending upon their distance from highly populated areas. Accordingly, this identifies the problem that the literature lacks one definition for rural that can be used to compare rural and nonrural schools.

Defining rural. The federal government defines rural in over 15 different ways depending on the purposes of specific organizations (Tieken, 2014). The Department of Agriculture, the Office of Management and Budget, U.S. Census, and the National Center for Education Statistics (NCES) all use different characteristics and measurements of rural to meet their needs (Koziol et al., 2015). When focusing on education, the NCES definitions are likely most appropriate.

The NCES definitions use the terms "urbanized area" which refers to an area with a population of 50,000 or more and "urban cluster" which refers to an area with a

population between 2,500 and 50,000 (U.S. Department of Education, n.d.). Figure 2 shows the three different categories for rural and their definitions according to the NCES.

Figure 2
NCES Rural Category Definitions

Locale /Rural Subcategory	Definition
Fringe	Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster
Distant	Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster
Remote	Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster

While the definitions above vary due to distance from larger populations, Tieken (2014) points out that rural America varies in many other ways as well and includes "Native American reservation communities in the West, small mostly white New England fishing villages, midwestern farm towns with growing Latino populations, African American communities scattered along the Mississippi Delta, and isolated hamlets tucked into the Appalachians and Rockies" (p. 6). These vast differences in rural communities' definitions result in implications for rural education researchers.

Defining rural in educational research. In an extensive study of available rural education research, Arnold, Newman, Gaddy, and Dean (2005) found that depending on which definition of rural a researcher uses, the number of rural students in the United States could range from 1.1 million to 11.6 million thus highlighting the need for researchers to be specific in their definitions. Researchers are also cautioned not to

generalize about rural areas based on their study alone (Koziol et al., 2015; Miller, 2012). Rural locations close to metropolitan areas may yield different results than those more remote (Miller, 2012) and results from a county level study may vary from rural education studies at the state level (Koziol et al., 2015). Former editor of the *Journal of Research in Rural Education,* Theodore Coladarci (2007), agrees that researchers should not make generalizations and adds that one definition of rural is not necessary. What is necessary is for researchers to thoroughly describe the context of the rural location of the study. Rural researchers can take their pick of definitions as long as they choose one that matches their theoretical foundations and motives of the study (Howley, Theobald, & Howley, 2005; Koziol et al., 2015).

Educational research in rural settings. Educational research in rural settings has its own set of characteristics and rules, many of which were identified by Arnold et al. (2005) in their analysis of rural education research. First, between 1991 and 2003 the most common rural education study was on programs and strategies for working with students with special needs. They also point out that many of the studies were simply rural in context, meaning they did not uncover a rural phenomenon, but the research happened to take place in a rural setting. While the focus of their analysis is quantitative studies, the authors state that qualitative studies comprise the majority of rural education research. The reason for this may be because rural researchers want to hear the stories of rural communities and schools (Tieken, 2014). Rural researchers also often tend to have strong convictions about rural settings that could result in a preference towards the descriptive nature of qualitative studies (Coladarci, 2007).

Recommendations for future rural research includes identifying ways to improve the pedagogical skills of teachers in order to positively impact student achievement (Arnold et al., 2005). As Howley et al. (2005) explain, “Rural education research simply must ask what sort of schooling rural kids are getting, why they are getting it, who benefits and who gets injured in the process, and by what mechanisms” (p. 3).

As illustrated in this section, rural communities, rural schools, and rural education research have a history and characteristics distinctive from their nonrural counterparts.

Senge’s Five Disciplines of a Learning Organization

Peter Senge, the director of the Society for Organizational Learning at the Massachusetts Institute of Technology, is a leading expert on how all organizations, not specifically schools, develop (Newcomb, 2003). Senge (2006) defines a learning organization as one “where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together” (p. 3). He asserts that a learning organization is possible because humans, by nature, love to learn. Everyone can think of a time in which they were part of a successful learning organization, whether in extracurricular activities or at work, and they want to recreate that experience (Senge, 2006). The way in which an organization can become more “learningful” is by mastering five disciplines. Senge (2006) defines a discipline as a “developmental path for acquiring certain skills or competencies” (p. 10). The next sections provide an overview of each of the five disciplines: personal mastery, mental models, shared vision, team learning, and systems thinking.

Personal mastery. The premise of the discipline of personal mastery is that an organization cannot learn if the individuals within that organization are not committed to learning. Personal mastery has two underlying movements. The first is "continually clarifying what is important to us" and the second is "continually learning how to see the current reality more clearly" (Senge, 2006, pp. 141-142). In order for an organization to develop this discipline, there must be a safe environment in which individuals are free to practice inquiry and test the status quo. As a leader within an organization, the best strategy to foster personal mastery is to simply model it oneself. One caveat of personal mastery, Senge (2006) says, is that "embarking on any path of personal growth is a matter of choice. No one can be forced to develop his or her own personal mastery. It is guaranteed to backfire" (p. 161).

Mental models. The next discipline of a learning organization is mental models. Mental models are ingrained constructs of the world, often of which one is unaware, that restrict one to familiar thoughts and behaviors. Though individuals and organizations are often ignorant to their mental models and the way they affect their actions, there are three things organizations can do to become aware of mental models and test their validity: (1) identify tools to develop reflection skills, (2) institutionalize the regular practice of reflecting on mental models, and (3) create a culture that challenges one's own thinking and promotes inquiry. Mental models can be a hindrance to a learning organization unless leaders recognize that beliefs held as facts may very well be assumptions that need to be examined and tested (Senge, 2006).

Shared vision. A shared vision is a "force in people's hearts" (Senge, 2006, p. 192) compelling enough to garner support from multiple people which creates a common

feeling that provides coherence to activities within an organization. Having a shared vision encourages individuals within an organization to grow because they want to achieve the common goal. Without a shared vision, there is an overwhelming adherence to the status quo due to the absence of a common goal pulling the organization in a forward direction. Senge advises leaders to be wary of mistaking compliance to a vision with genuine commitment to the vision. While compliance may appear desirable, energy and passion only come from an individual who has chosen to commit to the goal. A leader cannot make this choice for an individual, but simply creates the conditions within the organization that are favorable to enrollment by allowing the choice, being honest about the vision, and enrolling in the vision oneself. Shared visions better organizations as they spread because of "the reinforcing process of increasing clarity, enthusiasm, communication, and commitment. As people talk, the vision grows clearer. As it gets clearer, enthusiasm for its benefits builds" (Senge, 2006, p. 211).

Team learning. Senge (2006) defines team learning as "the process of aligning and developing the capacity of a team to create the results its members truly desire" (p. 218). Team learning involves mastering discussion and dialogue. Three conditions are necessary for dialogue to occur. First, all participants must suspend their assumptions about the topic and about the other participants in the dialogue. Second, they must view all participants as colleagues. Third, there must be a facilitator who keeps the focus on dialogue, which is a mode of communication that leads to participants gaining insights not possible individually. Dialogue is preferred to discussion, which is a mode of communication that leads to each participant wanting their viewpoint to "win." In addition, Senge (2006) points out, "The discipline of dialogue also involves learning how

to recognize the patterns of interaction in teams that undermine learning" (p. 10) such as members who hide dissenting opinions in order to maintain the facade of a conflict-free team.

Systems thinking. The fifth discipline is systems thinking, which is the joining of the previous four disciplines into an organized practice. It augments each of the other disciplines and recognizes how each one is necessary for the others to be successful. As Senge explains, "We're all close to a lot of trees. Seeing the forest is a lot harder" (First Things First, 2013). Without systems thinking to remind leaders to view the organization as a whole, the focus would be on the individual disciplines and not how they work with each other to foster the learning organization.

Though Senge's (2006) text articulates ways for organizations to learn and grow, the examples he provides are all from businesses as opposed to education. Therefore, the history of research on professional development in schools was separate from Senge's research on the five disciplines until much more recently, which is discussed in the final section of this chapter.

Professional Development

Professional development (PD), sometimes called staff development, has been defined as "those processes that improve the job related knowledge, skills, or attitudes of school employees" (Sparks & Loucks-Horsley, 1989, p. 41). Another way to describe PD is as the preparation teachers experience after they have begun service (Smith, 2010). Activities that fall under the PD umbrella may be formal, like workshops, conferences, trainings, or university coursework; job-embedded (organized or spontaneous), like teacher collaboration on instruction, collective research, and peer observation; or

inductive which includes mentorship and seminars for beginning teachers (Desimone, 2009; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Because of the wide variety of activities that constitute professional development, it has become embedded in the everyday lives of teachers (Desimone, 2011).

Professional development has gained importance in the teaching profession for several reasons. First, teachers are the most valuable school-based resource available to schools and thus their development is crucial to the overall quality of the district (Miller, 2012). Secondly, gains in student achievement are generated when teachers change their classroom practice as a result of the knowledge they gained through PD (Desimone, Porter, Garet, Yoon, & Birman, 2002). Third, educational policymakers have recognized the importance of PD in connecting policy to student learning (Kisa & Correnti, 2015). Finally, the broad range of activities that comprise PD allows teachers to achieve growth not only in their classroom practice, but personally, socially, and emotionally as well (Desimone, 2011).

Educational leaders took notice of the importance of staff development in the 1980s when there was a surge of articles, books, conferences, workshops, and reports on the topic (Sparks & Loucks-Horsley, 1989). Though PD was receiving increased attention, for decades, research on the topic focused on teacher satisfaction and attitudes towards professional development—not on what makes it effective or produces results (Desimone, 2011).

Professional development in the United States. In 2009, the National Staff Development Council, commonly called Learning Forward, published the first report of a three-phase study on the status of professional development in the United States (Wei et

al., 2009). The first phase focuses on the format of PD American teachers experienced. The second phase, which includes a report published in 2010, analyzes the content of the PD teachers received (Wei, Darling-Hammond, & Adamson, 2010). The report of the third phase includes case studies of state policies regarding teacher learning (Jaquith, Mindich, Wei, & Darling-Hammond, 2010).

The first report examines data from the 2003-2004 NCES Schools and Staff Survey (SASS). According to the survey, 92% of U.S. teachers took part in traditional, workshop professional development in 2003-2004. Percentages were not quite as high for job-embedded methods. Seventy percent (70%) of teachers reported regularly scheduled collaboration time with other teachers, while only 63% participated in peer observation (Wei et al., 2009).

The report completed for phase two of the study analyzes the SASS survey results from 2007-2008. It also compares this data to the SASS surveys from 2000 and 2004. Teachers reported on their participation in PD focused on the content of the subject(s) they teach, instructional computer use, reading instruction, and classroom management. In 2007-2008, more teachers participated in PD focused on the content of the subject they teach than any other area. This also saw the biggest growth as almost 88% of teachers participated in 2007-2008, but less than 60% did in 2000. Professional development related to classroom management had the lowest percentage of participation with less than half of teachers experiencing it (Wei et al., 2010). This contrasts with a Boston study in which middle and high school science teachers could voluntarily choose to participate in a specialized PD program. When surveying the teachers that elected to participate, 78% stated they wanted to learn new instructional strategies, whereas 67% wanted to gain

new knowledge about their content (Fields, Levy, Karelitz, Martinez-Gudapakkam, & Jablonski, (2012).

One consideration districts must make when planning both the format and content of PD activities is how it will be funded. Professional development for teachers is funded at the federal, state, and district levels. The federal government funded $1.5 billion for teacher PD in 2004-2005 (Desimone, 2009). In Minnesota, state statute requires districts to set aside at least 2% of the basic formula for staff development (Staff Development Program, 2015). While there is money going towards PD, it may not be enough to sustain the highest-quality professional development for all teachers. Desimone et al., (2002) found that schools must decide "whether to sponsor shorter, less in-depth professional development that serves a large number of teachers or to support more effective, focused, and sustained professional development for a smaller number of teachers" (p. 105). The recommendation from these authors, based on a three-year longitudinal study of professional development, is that districts should fund higher-quality PD for fewer teachers in order to see the most change in classroom practice (Desimone et al., 2002).

Five models of staff development. Sparks and Loucks-Horsley (1989) organized existing research about effective staff development into five models noting the theoretical backgrounds and outcomes of each. They are as follows:

1. individually-guided staff development;
2. observation and assessment;
3. involvement in a development or improvement process;
4. training;
5. inquiry.

Individually-guided staff development. Individually-guided staff development occurs when a teacher "determines his or her own goals and selects the activities that will result in the achievement of those goals" (Sparks & Loucks-Horsley, 1989, p. 42). The rationale for the success of this model is that teachers are more motivated when they have selected goals based on a self-assessment of their needs. In addition, it is perhaps the most differentiated model for staff development. Although a workshop on classroom management techniques could be very applicable for a novice teacher, the same information is unlikely to pertain to a veteran teacher. Individually-guided staff development includes four steps: (1) identifying a need, (2) developing a plan to meet the need, (3) participating in planned activities, and (4) assessing whether or not the need was met. When used more formally, the teacher may submit a summary of the activity and what was learned, or report to a colleague. However, it is not uncommon for the assessment to remain a reflective process for the teacher alone. A teacher may engage in individually-guided staff development through something as simple as reading a journal article to a more complex special project of a mini-grant. Unless part of a funded mini-grant, the outcomes of this model are difficult to measure as they are largely left to the perception and self-reporting of each teacher (Sparks & Loucks-Horsley, 1989).

Observation and assessment. Observation and assessment involve a teacher receiving feedback on his or her classroom performance. Teachers may be reluctant to see the benefit of this model of PD as teachers often view observation as a form of evaluation. Nonetheless, there are opportunities for growth for both the teacher being observed and the teacher who is observing. For the teacher being observed, his or her reflections on one's own practice are enhanced when accompanied by the observations

from someone else. The teacher who is observing sees the instructional methods of a colleague and can use the time spent preparing feedback for the observed teacher to reflect on his or her own practices. Furthermore, the collaborative post-observation discussion can reveal insights neither teacher had considered individually. The reliability of observation is strengthened when using an observation system and pre-observation conference (Sparks & Loucks-Horsley, 1989).

Involvement in a development or improvement process. The third model identified is involvement in a development or improvement process. Curriculum development is included in this model as teachers may need to learn new content in order to meet new standards for curriculum. Teachers engage in school improvement when a need is identified by an individual, group of teachers, school faculty, or administrator. Then those involved determine a plan to address the need. An underlying assumption of this model is that adults learn best when they have a problem to solve. In order to come up with a solution to the problem, new knowledge or skills often need to be acquired which results in professional learning. Similar to individually-guided staff development, not much research is available in the outcomes of this model. However, two case studies using the school improvement process model of PD resulted in large gains on state reading tests. In the first, the teachers of the school examined the lowest scoring test objectives, identified instructional strategies that targeted those objectives, and self-selected growth activities to implement the strategies. In the second case, teachers reorganized the Kindergarten program, adopted a new reading series, and composed a booklet for teachers that included instructional strategies and practice test questions. In

both cases, reading test scores rose over 20% in three years or less (Sparks & Loucks-Horsley, 1989).

Training. Training involves the workshop-type PD sessions with which teachers are likely most familiar. "In the minds of many educators, training is synonymous with staff development" (Sparks & Loucks-Horsley, 1989, p. 45). With training, the trainer selects the activities that will best meet the goals of the session. While workshops have many critics, which is discussed later, research has found certain benefits. First, it is a very cost-efficient model because of the high ratio of participants to trainer. Second, it allows for demonstrations which help teachers see what the desired outcomes look like. Last, when the trainer is a fellow teacher, participants believe the suggestions are more practical because the teacher understands their setting and student population. In fact, teachers prefer trainings led by their peers. The training model can be followed up with the aforementioned observation and assessment model to increase its effectiveness of transferring the information from the training to the classroom. Studies that have produced the best results from the training model include multiple sessions over time (Sparks & Loucks-Horsley, 1989).

Inquiry. The final model identified is inquiry. Inquiry, like individually-guided staff development and involvement in a development or improvement process begins with the identification of a need or problem. This can be done by a teacher or group of teachers. After identifying the problem, data is collected including research and classroom data. The data is analyzed and interpreted and changes are made at the school or classroom level. Then, new data is collected in order to assess the effects of the

changes. The model is beneficial because it engages all teachers involved in research which improves their knowledge and skills (Sparks & Loucks-Horsley, 1989).

At the time of their writing, Sparks & Loucks-Horsley (1989) noted that while descriptive studies existed, few experimental studies were available about professional development. Since that time, more research has become available refining and building on their ideas.

Five features of effective professional development. Garet, Porter, Desimone, Birman, & Yoon (2001) present the findings from a national, cross-sectional study analyzing surveys from 1,027 teachers engaged in the Eisenhower Professional Development Program. Unlike Sparks & Loucks-Horsley (1989) who identify models of effective PD, they instead identify six features that make professional development effective according to the survey results. The six features include three structural features and three core features. The structural features include the following:

1. Reform model - the PD involves a study group, mentoring relationship, research project, or similar activity as opposed to a traditional workshop or conference.
2. Duration - the PD is extended over a period of time.
3. Collective participation - the activity emphasizes participation from groups of teachers from the same school, grade level, or department.

The core features include the following:

1. Active learning - the PD includes opportunities for teachers to engage in analysis of teaching and learning.
2. Coherence - the PD incorporates experiences consistent with teachers' goals, standards, and assessments.

3. Content focus - the focus of the PD is on improving teachers' content knowledge.

The study concludes that when the six features are present in professional development, teachers self-reported increases in their knowledge, skills, and practice. However, the study also determines that most district-provided PD activities are lacking in the six features (Garet et al., 2001).

Desimone et al. (2002) followed up on the Garet et al. (2001) work with a three-year longitudinal study examining the six features of effective professional development. After the third year of the study, 18.7% of the PD activities teachers experienced were the reform type. The average duration for the PD activities 18.2 hours spread over a range of two days to one week. The activities included collective participation between 15-20% of the time. The result was the same for the activities including active learning opportunities. Survey respondents indicated that approximately 60% of the PD activities included coherence. The last feature, content focus, was measured using a different methodology. The analysis of that feature concludes that when teachers received PD on specific instructional strategies, technology use, higher-order instructional methods, and alternative student assessments, the use of these practices in their classrooms increased. Overall, the study found that PD is more effective at changing classroom practice when it includes collective participation, active learning, coherence, and a content focus. There was also a positive effect, though not as strong, when the PD was a reform-type activity. The longitudinal study did not conclude that the duration of the PD was a factor in its effectiveness (Desimone et al. 2002).

Desimone continued to study professional development using the features from the Garet et al. (2001) study. However, over time, reform type was no longer included as

one of the features of effective professional development (Desimone, 2009). Desimone (2011) also researched activities that are considered professional development. Among them, she includes workshop, inquiry, observation, assisting with a school improvement plan or choosing new curriculum, reading a professional journal and other individual activities. Clearly, the models identified by Sparks & Loucks-Horsley (1989) are still relevant.

Desimone (2011) also extends her theory of the now five features of effective professional development to include a framework for implementing PD. The framework includes four steps:

1. Teachers experience PD including the five features.
2. Teachers knowledge and skills are increased and/or their beliefs and attitudes are changed as a result of the PD.
3. Teachers use their new knowledge for content and/or pedagogical improvements to their instruction.
4. The classroom changes result in an increase in student learning.

After defining the five features and establishing a framework, the final component of successful professional development is evaluation. For this, surveys, observations, and interviews provide useful data when well-administered (Desimone, 2011).

Identifying goals of professional development. Smith (2010) expands on the research about models and features of effective PD and developed a framework for choosing types of PD activities based on the overall goal. If the goal is to build awareness about a topic, then the approach to the PD is to disseminate information. Activities to achieve the goal include website posts, newsletters, and announcements. To build

knowledge through PD, planners should take a training approach. The activities may include a one-shot workshop or a conference session. When the overall goal is to change teaching practice, a professional development approach is appropriate and the activities would include longer-term, multi-activities that include the Desimone's (2011) five features of effective PD. Finally, to change teachers' theories and assumptions, the approach should be professional learning. Activities to achieve the goal would include job-embedded learning and communities of practice that include Webster-Wright's (2009) features of professional learning: learning through experience, learning from reflection, and learning mediated by context. Smith's (2010) model does not discount any particular PD activities, but organizes them according to when they will be most purposeful.

General professional development delivery methods. Though not associated with any one particular educational researcher, several methods of delivering PD repeatedly appear in the research. This section describes these methods which include the following: workshop, coaching, PLCs, and action research.

Workshop. One activity that is often discounted in the literature, but remains the most common way in which U.S. teachers receive PD is the workshop. Garet et al. (2001) define workshop as a "structured approach to professional development that occurs outside the teacher's own classroom. It generally involves a leader or leaders with special expertise and participants who attend sessions at a scheduled time" (p. 920). As previously stated, most U.S. teachers experience the workshop method of professional development with 92% of teachers experiencing it in 2003-2004 (Wei et al., 2009). Desimone et al. (2002) found that 18.7% of the PD experienced by teachers in their

longitudinal study was reform type (PD involving a study group, mentorship, or research, instead of a traditional workshop). Thus, the remaining 81.3% was traditional, workshop type PD. The results were similar in the cross-sectional study by Garet et al. (2001) which found that 23% of activities were reform type and the remaining 77% workshop. Though extremely prevalent as a PD activity for teachers, this method has many critics. The consensus among researchers is that these learning experiences do not help teachers change their instructional practice (Kisa & Correnti, 2015). Wei et al. (2009) claim the one-shot workshop is ineffective. Reynolds, Murrill, & Whitt (2006) further qualify that in a workshop, learners are passive and needs, such as being at a certain readiness level or feeling empowered and challenged, are not met. Others, however, acknowledge that there can be some benefit to teachers when PD is delivered through workshop. Sparks & Loucks-Horsley (1989) state that workshop is effective enough to change teaching practice, just not with all teachers or all teaching practices. In a survey study of over 500 elementary teachers from 41 different states, 25% responded that their best PD experience involved attending a workshop with follow up coaching (Glover et al., 2016). Granted, the results did not reflect the respondents' experiences solely with workshop.

Though workshop appears to be a mainstay for teachers' professional development, in Minnesota, where the research takes place, the statute on staff development requires that each district's staff development emphasize coaching, professional learning communities (PLCs), and action research (Staff Development Program, 2015). Each is briefly described with ties to previously discussed literature.

***Coaching*.** Coaching usually involves experts in a particular subject or instructional practices working closely with teachers to improve classroom practice for

the eventual outcome of increasing student achievement. Most coaches are former classroom teachers, though many continue to teach part time while serving as coaches the remaining time. Coaches provide supportive critiques of classroom practice and conduct classroom observations with a specific focus (Wei et al., 2009). Coaching has been described in educational literature since the early 1980s. Joyce & Showers (1983) studied the model extensively and note that simply learning about a new teaching skill is not sufficient to transfer the skill into classroom practice. "Continuous practice, feedback, and the companionship of coaches is essential to enable even highly motivated persons to bring additions to their repertoire under effective control" (p. 4). Studies looking at the outcome of coaching are mixed. In several studies that compare the teaching practices of teachers who received traditional PD versus those who received coaching, the teachers who received coaching were more likely to implement the desired practices (Wei et al., 2009). In a study that compares workshop-only staff development with peer coaching and consultant coaching, peer coaching was the most effective in improving classroom performance (Sparks & Loucks-Horsley, 1989). However, a 2001 study from the Netherlands found that teachers who received coaching were more confident in their abilities, but not actually more effective than teachers who were not coached (Wei et al., 2009).

Professional learning communities. Like coaching, PLCs involve peers assisting each other to improve practice, but in a different format. A PLC is a small group of teachers in continuous dialogue analyzing student performance and their teaching practice in order to become more effective. PLCs may engage in different activities such as examining student work or studying professional literature. Teachers in PLCs report

feeling a shared intellectual purpose and a collective responsibility to improve student learning (Wei et al., 2009). PLCs lead to change in teaching practice as a result of the depth of understanding that occurs after ongoing study by a committed group of teachers (Stewart, 2014). PLCs were found to be effective for changing teaching practices in a study of elementary teachers who were expected to reform their mathematics instruction and worked in a group to examine student assessments (Darling-Hammond, 2010). A five-year study of 1500 schools identified successful PLCs as the catalyst for reducing student dropout rates, decreasing absenteeism rates, and increasing academic achievement in math, science, history, and reading (Wei et al., 2009).

One of the most popular frameworks for PLCs was developed by Dufour, Dufour, Eaker, and Many (2006). Richardson (2011) purports that, each year, tens of thousands of teachers attend professional development endorsing the model. The focus of the Dufour et al. (2006) PLC structure is on four critical questions:

- What do we want students to learn?
- How will we know if they have learned it?
- What will we do if they have not learned it?
- How will we provide extended learning opportunities for students who have mastered the content?

In addition, there is an emphasis on teams developing and using common assessments (Dufour & Reeves, 2016). In a recent tweet from a professional development presentation on the model, one of the presenters is quoted as saying, “Don’t call yourself a PLC if you are not comparing common assessment data” (Holmquest, 2019).

***Action research*.** Action research involves a teacher or small group of teachers examining classroom practice for teaching and learning problems in order to find solutions. It is currently more prevalent as a PD activity in nations outside of the U.S. such as Singapore and Australia (Wei et al., 2009). Nonetheless, at the core of action research is inquiry, which is identified as one of the models of professional development. In a study of collaborative inquiry projects, teachers became more informed about when and how to apply research findings to their own classrooms, experienced more supportive and collegial relationships, and improved their teaching by learning more about it (Sparks & Loucks-Horsley, 1989). Self-examination of teaching practice followed by inquiry and action research leads to some of the most powerful learning experiences for teachers (Desimone, 2011).

Factors affecting implementation. This review of literature identifies factors that affect the implementation of new practices in teachers' instruction in regard to specific PD models, features, and activities. There are additional factors that both facilitate and hinder implementation. Minnesota recognizes the importance of transferring professional development to teaching practice as the statute requires that PD activities "provide opportunities for teachers to practice and improve their instructional skills over time" (Staff Development Program, 2015). Joyce & Showers (1983) maintain that teachers are wonderful learners and, when provided with sufficient PD, can implement almost any strategy into their practice.

However, teachers are unlikely to implement professional learning when it is competing with other job-related expectations. If professional development is not seamlessly integrated into the school's overall efforts and daily routines, teachers feel a

detachment from what they do in PD to what they do in their classrooms (Darling-Hammond, 2010). This integration supports several studies in which the intensity and duration of PD is directly related to the degree of change in practice (Desimone et al., 2002; Glover et al., 2016). Eliminating the detachment between PD and the classroom by bringing them together through peer observation also affects teachers' desire to implement new strategies into their instruction. A study of 12 schools in which teachers participated in peer observations with follow-up feedback found that the teachers were more motivated to develop effective teaching practices (Darling-Hammond, 2010). Improvements in teacher practice and student outcomes have been found in studies of professional development in which teachers identify the concepts they want students to learn and identify the content that will cause problems for students (Darling-Hammond, 2010). In a longitudinal study analyzing the implementation of the reform model America's Choice, Kisa & Correnti (2015) found that when PD successfully led to the implementation of the reform strategies, it was also successful in improving overall teacher practice.

Darling-Hammond (2010) contends that professional development is most effective in improving teacher practice when multiple methods of PD are used in combination. Elementary teachers expected to reform their teaching of mathematics made significant changes through curriculum development. They began by attending workshops where they learned about the mathematical strategies they were expected to teach. Then they developed strategies and tested them in their classrooms. Follow-up workshops allowed teachers to debrief their experiences with other teachers and make revisions. Several urban districts devised a systemic approach to improving teacher

quality which included summer institutes focused on core teaching strategies, on-site coaching, peer observations, and study groups.

Guskey's levels of evaluating professional development. Despite the extensive body of literature related to professional development, limited research exists on the evaluation of professional development. A literature search conducted using Education Full Text (EBSCO) returns over 29,000 results when the phrase "professional development" is entered. The results decrease to around 3,300 when "professional development" and "evaluation" are searched. The results again decrease to only 330 when the phrase "professional development evaluation" is searched. Finally, the phrase "evaluating professional development" returns just 59 results. In the available literature, however, Guskey's (2000) framework is "the most frequently cited evaluation model" (Merchie, Tuytens, Devos, & Vanderlinde, 2018, p. 145). Guskey's (2000) framework aims to help schools determine if professional development activities have achieved the intended outcomes, since all professional development efforts should be intentional (Guskey, 2002). Guskey (2000) clarifies that it is nearly impossible to prove that professional development impacted improvements on student achievement. However, it is possible to "collect very good 'evidence' about whether or not professional development is contributing to specific gains in student learning" (p. 87).

The framework is organized into five levels that progress from simple to complex with success at the previous level being a prerequisite for success at the next level (Guskey, 2000). The five levels of evaluating professional development are as follows:

- Level 1: Participants' Reactions
- Level 2: Participants' Learning

- Level 3: Organization Support and Change
- Level 4: Participants' Use of New Knowledge and Skills
- Level 5: Student Learning Outcomes

The first level of evaluation measures participants' satisfaction with the PD experiences. Questions that assess this level may include items that ask if the PD was relevant and engaging, or if the environment, including temperature and seating, was comfortable. The second level asks whether or not participants learned something from the PD experience. This level is assessed by determining if participants learned new knowledge or skills either by directly asking them or informally quizzing them on the intended learning goals. The third level assesses the extent to which the organization has supported and made changes to be conducive to professional development efforts. Questions used to determine success at this level include items regarding provision of time, administrative support, adequate resources, and protection from intrusions. The fourth level examines if professional practice was impacted by the PD experience. Evaluators will assess both the degree and quality of the implementation after determining the indicators of the implementation. The fifth and final level of evaluating professional development assesses student learning outcomes. This level may examine student achievement on assessments, but it may also include change in students' attitudes, study habits, or attendance depending upon the learning targets of the PD (Guskey, 2000).

In addition to being the most frequently cited professional development evaluation framework, Guskey's (2000) model of five levels is also well-respected. In their work evaluating a training program for school leaders in Cyprus, Nicolaidou and

Petridou (2011) found that Guskey's (2000) model is a well-known, sound conceptual framework that is useful for collecting evidence beyond participant satisfaction. Baird and Clark (2018) contend, "In seeking to evaluate effective professional development that changes teacher beliefs, instructional practice and student outcomes, there is a need to include all levels of Guskey's framework" (p. 329). Finally, Guskey's (2000) model provides a link between professional development evaluation and learning organizations (Senge, 2006) with its systems thinking foundation (Baird & Clark, 2018).

Professional Development with High School Teachers

The research question addresses professional development in a high school, or secondary, setting. Therefore, examining the cross-section of literature between professional development and secondary teachers is important. Lucilio (2009) note that there is limited research available on secondary teachers. Furthermore, there is even less available when it comes to what secondary teachers need "to improve teaching and learning for all students" (p. 54). Though the research may be narrow, there is some information available about what works for high school teachers regarding professional development, as well as their preferences.

Lester (2003) researched professional development for secondary teachers specifically by surveying, observing, and interviewing teachers from eight different high schools. The results of the study show that secondary teachers are passionate about their content area and are willing to learn about new strategies that will help students learn their content better. Lucilio (2009) echoes this result by finding that high school teachers believe content-specific experiences are most important to their professional development. In a study of high school science teachers, a focus on deep content

knowledge was a contributing factor to the success of professional development efforts aimed at getting the teachers to use inquiry-based instruction (Jeanpierre, Oberhauser, & Freeman, 2005).

In addition to content-specific topics, secondary teachers benefit the most when participating in hands-on or demonstration methods of in-service (Lucilio, 2009; Jeanpierre et al., 2005). Secondary teachers are also more likely than elementary teachers to attend out-of-district professional development opportunities and be reimbursed by the district for those fees (Wei et al., 2009). In regard to motivating high school teachers to improve teaching skills, Lester (2003) determined that teachers who are already heralded as being most effective are the most anxious to improve. In addition, high school teachers may be more motivated when asked what they need to improve student learning, and when those suggestions are used to plan future PD (Lucilio, 2009).

Conversely, there is literature that portrays less positive image of professional development for high school teachers. In general, high school teachers are "stereotyped as a difficult audience to reach" (Lucilio, 2009, p. 73). In comparison with elementary teachers, Wei et al. (2010) found that secondary teachers have lower levels of participation in PD, spend fewer cumulative hours throughout a school year on PD, are less engaged in collaborative work, and find less value in PD. High school teachers need to be held accountable for participating in PD and implementing practices or they are less likely to do so (Lester, 2003; Jeanpierre et al., 2005). In looking at barriers that prevent secondary teachers from implementing new instructional practices, teachers stated that an overload of information is covered in a short period of time, initial enthusiasm is quickly diminished by daily tasks, and a lack of everyone cooperating makes it difficult to affect

change (Lester, 2003). In Jeanpierre et al.'s (2005) study of science teacher professional development, 21% of teachers who were not using inquiry-based methods in their teaching before the professional development were still not using inquiry-based methods after the professional development. Based on the characteristics of the participants who did not change their practice, the authors recommend more research on how careers prior to education and years of teaching affect one's response to professional development.

Professional Development in Rural Settings

To this point in the literature review, research about rural schools and professional development have been discussed separately. However, there is a body of literature available specifically pertaining to the professional development of teachers in rural schools. This section identifies the need for PD in rural schools, challenges of providing it, the likelihood of collaboration, and the specific PD needs of rural teachers.

Researchers of this distinct area illustrate the need for quality PD in rural schools. Recruiting highly-qualified teachers is a challenge for rural schools because of their geographic isolation, lower salaries, higher poverty rates in their communities, and fewer community conveniences (Azano & Stewart, 2015). As a result, the teachers that end up in rural schools are more likely to be novices, less likely to have attended competitive colleges, and less likely to have a master's degree (Gagnon & Mattingly, 2015; Miller, 2012). Although, Miller (2012) points out that it is unclear if there are fewer teachers with master's degrees in rural schools because those teachers prefer nonrural jobs, or because rural administrators prefer to hire lower-salaried teachers due to tight budgets. In addition, rural school teachers are more likely to teach out of their field or license area (Beesley, Atwill, Blair, & Barley, 2010; Gagnon & Mattingly, 2015). Because of the

difficulties recruiting experienced, highly-educated teachers, improvement of the overall teacher quality in rural schools must come from "developing the skills of teachers who are already committed to their classrooms and schools" (Barrett, Cowen, Toma, & Troske, 2015).

Although there is a great need for quality PD in rural schools, providing it is not without its challenges. First, teachers in rural schools often face professional isolation in which a teacher may be the only one of his or her content area in the school or district making collaboration on content delivery methods difficult. Second, the weak tax base in rural communities leaves districts without extra funds to support PD efforts. Last, the community-minded social practices of rural teachers tend to cultivate preference towards tradition over change in an effort to avoid confrontation (Howley & Howley, 2005).

Challenges also exist in the way PD is perceived by teachers in rural schools. In a study of rural elementary school teachers, researchers found evidence that teachers passively resisted technology-related professional development. Furthermore, they resisted the use of technology in their classrooms (Howley, Wood, & Hough, 2011). Nonetheless, in a different study by Wallace (2014), fewer than 50% of rural teachers felt they received sufficient PD in instructional technology. Almost 60% of rural teachers reported having no role in the planning of their professional development and indicated that district-level professional development was the least effective.

Some rural schools benefit from their small size which promotes cooperation among staff in PD (Howley & Howley, 2005). Chance & Segura's (2009) case study of a rural high school identified benefits of collaboration. The teachers had collaboration time every other week due to a late start for students. The collaboration time was used to write

common assessments, design essential learnings, and work on relationships within staff. The teachers collectively examined data reports from state testing and made changes to their curriculum accordingly. The attempts to improve student learning within the classroom occurred after a professional collaborative culture had been developed. The case study revealed that the success of the collaboration was due to time being scheduled for it, groups being structured and focused, planning being student-centered, and both teachers and administrators being held accountable. The collaboration that occurs among rural teachers may explain why in a survey of rural principals, communication was rated as one of the lowest needs for professional development (Stewart & Matthews, 2015). The cooperation found inside the school building may extend beyond its walls as well. Chance & Segura (2009) suggest that rural schools are well-positioned to form partnerships with local resources to develop school programs and curriculum.

Rural schools have unique needs in the area of professional development. In order to meet the needs of rural students who experience geographic isolation and high-poverty, specialized PD is necessary (Azano & Stewart, 2015). Many rural schools have only recently received English language learners in their classrooms and now require PD on instructional strategies to serve those students (Chance & Segura, 2009). Finally, the policies formulated at the state and federal levels often do not take rural schools into enough consideration. Some states are now allowing remote rural schools to "establish new means of inducting, mentoring, and evaluating teachers," but some state policies are still missing the mark for rural districts (Gagnon, 2016, p. 49).

Though challenges, successes, and needs exist for professional development in rural schools, a recent study suggests that rural PD may not be that different from

anywhere else. A sample of elementary teachers from each NCES locale participated in a survey focused on their professional development experiences. The findings indicate that across all locales, the experiences teachers have with PD and their perceptions of it are more similar than different (Glover et al., 2016).

Senge's Five Disciplines in Schools

After the publication of Senge's original text of *The Fifth Discipline: The Art and Practice of the Learning Organization* in 1990, educational leaders began implementing the disciplines in education settings and a body of research about this implementation emerged. This section highlights the existing research of the five disciplines' affect on professional development in schools. Reynolds et al. (2006) found that by applying the principles of a learning organization to an education setting, which had previously been used only in business models, schools are able to learn new techniques to help members learn. Schools increase their capacity and rarely repeat mistakes when schools become learning organizations through the support of the five disciplines (Thornton et al., 2007). As Senge et al. (2012) began applying his work to schools, he noted that "no school's experience can be applied to another's situation wholesale" (p. 6) suggesting that every school will need to apply the disciplines in a way that fits their needs and people. Nonetheless, developing an organization that learns and grows is necessary to address the complex problems schools encounter in the United States today (Senge et al., 2012).

Personal mastery. Personal mastery, the first of Senge's five disciplines, is an innate part of many teachers' lives as they chose the profession with a strong sense of purpose (O'Neil, 1995). In fact, good teachers are naturally lifelong learners continuously gaining more knowledge about their content area and teaching practices throughout their

careers. Nonetheless, schools must be careful not to quash teachers' aspirations by overwhelming them with administrative mandates. In order to prevent this, schools should allow time for teachers to reflect on their personal visions (Senge et al., 2012). The Margaret Sue Copenhaver Institute for Teaching and Learning (MSCI) at Roanoke College has practiced applying Senge's five disciplines to teacher learning. The institute takes place during the summer and teachers stay on campus throughout the three-day learning experience. Personal mastery is naturally integrated into MSCI by the fact that participants choose to attend the institute as opposed to being required to attend by their school. In addition, the sessions allow participants to decide if they want to work individually or with others, and time is built in for teachers to apply newly-gained knowledge to their personal instructional practice. Finally, one of the main design structures of the institute is a schedule that allows attendees extended time for intensive study which fosters personal mastery (Reynolds et al., 2006).

Mental models. Not only does MSCI plan for participants to focus on the discipline of personal mastery, but the institute also coordinates opportunities to explore mental models: "By grounding each year's theme in constructivism, MSCI continuously encourages participants to examine their beliefs and understandings about teaching and learning" (Reynolds et al., 2006, p. 128). The organizers of the institute recognize that mental models are often below the surface of a teacher's awareness. They note, then, that professional development efforts must provide teachers with accurate images of classroom practice in order to counteract the assumptions created from mental models (Reynolds et al., 2006). Some of the ways mental models impact the practices of teachers today include expecting children from affluent families to perform better, expecting white

children to perform better than children of other races, and approaching students from poor families with a deficit perspective. All stakeholders related to the school, including school staff, parents, and community members, must have open conversations scrutinizing the influences that have lead to these mental models (Senge et al., 2012). Bringing these assumptions to the surface is necessary so "people can explore and talk about their differences and misunderstandings with minimal defensiveness" (Senge et al., 2012, pp. 99-100).

Team learning. The next of Senge's five disciplines of a learning organization is team learning. Senge recognizes that there is a big difference between learning done individually and learning done collectively (O'Neil, 1995). In fact, he believes that disastrous results will occur if a child's teachers are fragmented in their work. When teachers collaborate, Senge says, "Everybody starts to feel they're responsible regarding the environment for kids learning" (Newcomb, 2003). From a professional development standpoint, team learning is an important component. In order for PD efforts to develop this discipline, "it needs to be an ongoing process, with enough time to learn new ways of teaching, to develop esprit de corps, and to unlearn old habits" (Senge et al., 2012, p. 403). MSCI has incorporated some ways of fostering team learning at their institute. For example, they limit the number of participants to 100 to encourage more frequent interaction and conversation. In addition to small group and large group sessions, the institute's organizers plan social events in the evenings and provide longer periods of time for lunch and dinner (Reynolds et al., 2006). In team learning, the focus is not on developing an individual's skills, but building the cumulative capacity of the people within an organization, in this case a school, to pursue a shared vision (O'Neil, 1995).

Shared vision. Shared vision, therefore, is the next discipline to consider integrating into schools. Senge et al., (2012) compare a school system to a living system emphasizing, "it takes its vitality and energy from the commitments that people make to a common vision, into which they invest their thinking and emotions" (p. 87). Although shared vision provides energy for the school system, those within the system cannot be told what the vision is from authority. Mandatory visions from administration are not sustainable by others. Although a shared vision can not be established through a decree by administration, Farhat and Usman (2016) found that experienced teachers desire a shared vision with their principal. In fact, without it, teachers lose satisfaction and become "less motivated to reach the performance targets" (p. 51).

Therefore, when administrators want to encourage a learning organization, they should see themselves as one who brings together a process of developing shared vision as opposed to one who provides the answers. The process of building shared vision within a school should include the following:

> a group effort to develop images of "the future we want to create together," along with the values that will be important in getting there, the goals we hope to achieve along the way, and the principles and guiding practices we expect to employ. (Senge et al., 2012, p. 87)

In order for professional development to assist in this process, sessions should provide time for participants to work together conceptualizing how the school should progress (Senge et al., 2012).

Systems thinking. Systems thinking, the fifth discipline, is the one that harmonizes all the disciplines. In schools, systems thinking is a necessary part of

curriculum alignment across content and grade levels. A successful curriculum coordinator, therefore, is skilled at the discipline of systems thinking (Senge et al., 2012). Systemic awareness is also necessary when addressing solutions to student achievement issues. Senge says, “Otherwise, people see a problem with math scores and they'll go put pressure on the math teachers” (Newcomb, 2003). From a PD lens, a systems thinker will focus on building relationships for collaboration and develop a framework that encourages change. When this discipline is thoroughly implemented, it may not be seen as professional development at all. Instead, it simply becomes the way of doing work together. All disciplines, in conjunction with one another under the umbrella of systems thinking, will reveal the processes and topics that are necessary for growth (Senge et al., 2012).

Though research is limited on the overall effects of implementing learning organization disciplines in schools, a 2014 study of primary teachers in Turkey indicates positive results. Erdem, İlğan, and Uçar (2014) report that integrating practices consistent with the learning organization disciplines increased job satisfaction among primary teachers. Specifically, practices associated with developing shared vision and team learning had the greatest impact on job satisfaction. More generally, Reynolds et al. (2006) summarize that the impact of developing a learning organization orientation to professional development efforts “can recognize the systemic nature of change, the essential requirement of personal mastery, the merit of a common and consistent mental model, the value of shared vision, and the importance of team learning” (p. 132).

Chapter Summary

This chapter provides a background on the three main foci of the research questions: rural schools, professional development, and Senge's (2006) five disciplines of a learning organization. The main research question is as follows: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? The secondary research question asks the following: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The initial section of the chapter is an overview of rural education in the United States from the common one-room schoolhouse in the 1800s, to the increasing prevalence of rural education being considered "backwards" by the late 1800s. Next, the differences between rural and non-rural schools are discussed pointing out disparities in diversity, economics, and student achievement. The difficulty with defining rural is then noted referring to the number of different definitions within various government organizations. However, the following section indicates that one definition for rural is unnecessary when conducting educational research in a rural setting as long as the context is thoroughly described. Finally, the initial section concludes by looking at the characteristics of rural education research. Existing research includes predominantly qualitative studies and most commonly use rural simply as the context instead of unveiling a rural phenomenon.

The second section of this chapter explains the five disciplines of Senge's (2006) learning organization. Personal mastery, mental models, shared vision, and team learning are the first four disciplines with systems thinking, the fifth discipline, tying them all

together. In order for any organization to become one that learns and moves forward, the organization and all individuals within the organization need to work towards mastering the five disciplines.

The next section dissects the research on teacher professional development. To begin, an overview is provided regarding the PD teachers reported receiving explaining the most common delivery methods and content focus. Funding for PD is also briefly discussed. Next, several seminal studies on professional development are described including Sparks and Loucks-Horsley's (1989) five models of PD; Garet, Porter, Desimone, Birman, and Yoon's (2001) features of effective professional development; and Smith's (2010) goals of professional development. Then, research on the PD delivery methods of workshop, coaching, professional learning communities, and action research is explained, of which workshop is the most prevalent. The section looks at factors that support and hinder the implementation of PD topics into classroom practice pointing out that format and duration of PD both have an effect. Then, the section concludes by identifying Guskey's (2000) five levels of evaluating professional development which is the most frequently cited model of PD evaluation.

After the three main foci of the research questions are described, the next two sections of the chapter examine research on professional development combined with each of the other two focus areas: rural schools and Senge's five disciplines. First, the research on professional development in rural schools indicates that unique challenges are present since rural schools' teachers often lack much experience and are more likely to teach out of their licensed subject-area. Nonetheless, they benefit from the collaboration that can take place among a smaller faculty. The final section of the chapter

highlights Senge's five disciplines as they are implemented into professional development. When a school is a learning organization, visions cannot be delivered from administration to teachers; prevailing mental models about student achievement need to be continuously examined; and though teachers have a strong sense of purpose, they need time to focus on their personal mastery. As a result of integrating the disciplines into professional development, one study reported an increase in teacher satisfaction. The purpose of this chapter is to provide an understanding of the rural schools, professional development, and Senge's five disciplines of a learning organization. There is research available on each of the three areas individually, and on professional development in rural schools or professional development integrating the five disciplines. However, research does not currently exist at the cross section of all three areas. Therefore, this study adds a unique perspective to the current body of research.

The following chapter explains the methodology used to answer the research questions. The study is a qualitative case study using mixed methods data collection including elite interviews, a focus group, and a survey. The assumptions, researcher's positionality and assumptions of the study are also described.

CHAPTER THREE

Methodology

Chapter Overview

This chapter describes the research paradigm, research design, research site, data collection methods, data analysis methods, researcher positionality, and the assumptions of the study. A qualitative case study is used to answer the main research question: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? The secondary research question is as follows: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The study used mixed methods including elite interviews, a focus group, and a survey to gather information necessary to answer the research questions.

Paradigm

A qualitative approach was selected for this study due to its importance in rural education research. Researcher Michael Corbett explains in Bartholomaeus, Halsey, and Corbett (2014) that teaching in rural areas has led him to understand "the importance of strong and receptive qualitative research methodology as the foundation of professional teaching engagement" (p. 59). He later explains that qualitative methodologies are necessary to de-emphasize the dangerous shift away from culturally sensitive education towards standardized programs which put rural youth at a disadvantage (Bartholomaeus

et al., 2014). Maxwell (2013) states that qualitative research is "flexible rather than fixed, and inductive rather than following a strict sequence or derived from an initial decision" (p. 2). Qualitative researchers do not begin with a hypothesis, but instead gather details from the setting and begin to look for patterns among them (Hatch, 2002). Because no studies were found specifically exploring Senge's five disciplines in professional development in rural schools, there are no preconceived ideas of what can be expected to be found or what the results will uncover. Therefore, the flexible, inductive nature of a qualitative approach is more suitable.

Research Design

The research design is a case study that McMillan and Schumacher (2010) define as an "in-depth analysis of a single entity" (p. 344). Case study has been common in education because of its ability to provide knowledge about a group or organizational phenomenon (Yin, 2014). Case study is most appropriate when the research question asks "how" or "why" about a "contemporary set of events" and "over which a researcher has little or no control" (Yin, 2014, p. 14). The research questions of the study fit these specifications. The secondary research question is a "how" question: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The primary question examines a contemporary set of events which is the ongoing district-provided professional development: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? Finally, as the researcher, I had not had any control over the research site's professional development practices because I do not work in the district

and have not provided any PD for the district. Not only are "how" and "why" questions conducive to a case study design, but Bartholomaeus et al. (2014) also state, "Research showing the how and why of rural education outcomes is needed if we are to show the quality of what is happening in these settings and the challenges faced" (p. 69). Thus, the rural aspect of the research topic inspired a "how" question, and the question format influenced the selection of a case study design.

Research Site

When selecting a site for the study, it was important to ensure that the setting would provide the information needed to answer the research question and meet the goals (Maxwell, 2013; Hatch, 2002). The first consideration when choosing a research site was rurality. Green and Reid (2014) describe rural research settings as those "involving non-metropolitan life and livelihood" (p. 26). This definition is more simplified than the United States Census Bureau (2015) which classifies any population outside of an urban area or an urban cluster as rural. Urbanized areas are those having a population equal to or greater than 50,000 and urban clusters as areas having populations higher than 2,500, but fewer than 50,000. The city in which the research site is located is classified as rural. In addition, the high school itself is classified as rural (Universal Service Administrative Company, 2014). The school is located 14 miles from the nearest urban cluster, 15 miles from the nearest urbanized area, and 70 miles from the nearest metropolitan area. The Minnesota Department of Education (2018) reports the student population as 645 with 95.3% white. Twenty-nine percent (29%) of students receive free and reduced lunch, and 12.6% receive special education services. One student is identified as an English learner.

The Minnesota Department of Education (2018) reports 30.71 teachers and 4.36 other licensed professionals in the high school. Ninety-four and a half percent (94.5%) of teachers are teaching within their licensure area and 5.5% are teaching with special permission indicating out-of-field permissions or Tier 1 teachers. Since the research question focuses on professional development, information about the teachers' experience and education level was reviewed when selecting the site, as those may be factors in determining how professional development is delivered to and perceived by the teachers at the school. Fifty-four percent (54%) of teachers have earned a master's degree, which is 7.2% below the average of the public high schools in a 20 mile radius with a range of 52%-69% and 6.4% below the average of the public high schools in the same athletic conference with a range of 42%-80%. Approximately 69% of teachers have more than ten years experience, 25% have between three and ten years of experience, and 6% have fewer than three years experience. The average number of teachers at public high schools in a 20 mile radius with more than ten years experience is 64% with a range of 56%-69%. The average number of teachers at public high schools in the same athletic conference with more than ten years experience is 71.4% with a range of 51%-87%. When combined, this information indicates that teachers at the research site are slightly more experienced than teachers at the nearest public high schools, and slightly less experienced than teachers at public high schools in the athletic conference. In addition, teachers at the research site are slightly less educated than the teachers at the nearest public high schools and at public high schools in the athletic conference. For comparison, none of the cities in which the nearest schools or schools in the athletic conference are located are classified as rural other than the research site. However, the majority of the

schools themselves are considered rural (Universal Service Administrative Company, 2014). Yin (2014) says that one consideration for selecting a single case study as opposed to a multiple case study is the common case asserting that "the objective is to capture the circumstances and conditions of an everyday situation" (p. 52). The data for the experience and education of the teachers at the research site, when compared with other schools, suggests that this research site is a common case.

Methods

Maxwell (2013) explains that in a qualitative study, data can be anything the researcher observes while in the research setting, but "prestructuring your methods reduces the amount of data that you have to deal with, simplifying the analytic work required (p. 89). It is also important to get information directly from the source (McMillan & Schumacher, 2010). Therefore, all data was collected directly from individuals who plan or receive professional development at the high school research site.

Following a qualitative approach, the study used a mixed method design of concurrent triangulation which McMillan and Schumacher (2010) explain occurs when "the researcher simultaneously gathers both quantitative and qualitative data, merges them using both quantitative and qualitative data analysis methods, and then interprets the results together to provide a better understanding of the phenomenon of interest" (p. 403). Where one method is weak, the other method is strong, resulting in more credible conclusions (McMillan & Schumacher, 2010). The ability to use many different evidence sources is a strength of case study research. One analysis of case studies even found that those using multiple sources of evidence were of higher quality (Yin, 2014). Rural

researcher, Roberts (2014), asserts, "A mixed method approach can assist the researcher in obtaining a fuller and more informed picture of the issue being investigated" (p. 142).

Elite interview. This interview is one of the most important sources of evidence in a case study (Yin, 2014). Kvale and Brinkmann (2008) define elite interviews as those "with persons who are leaders or experts in a community, who are usually in powerful positions" (p. 147). Data collection began with two elite interviews, one with the principal of the high school and one with the individuals responsible for planning district-provided professional development. "Interviewing is an active process where interviewer and interviewee through their relationship produce knowledge" (Kvale & Brinkmann, 2008, p. 17). Maxwell (2013) explains that interviewing is often the only way to get information about situations that have taken place that the researcher cannot directly observe. It was not possible to observe all professional development activities that have taken place with high school teachers. Thus, the knowledge that was hoped to be produced through the interviews was an understanding of the main topics of PD their teachers had experienced over the past eighteen months. This information was useful for the focus group that occurred after the elite interviews. In addition, building leaders' perspectives on the presence of Senge's five disciplines in their professional development was obtained. This was compared to the teachers' perspectives during the data analysis.

Neither the principal of the high school or the professional development coordinators had any background knowledge in Senge's five disciplines of a learning organization. Therefore, during each interview, it was necessary to ensure that the interviewee's feelings were considered regarding being questioned about something with which they were unfamiliar. This is part of the balance an interviewer must maintain:

seeking necessary answers for the study while respecting the interviewee's views and emotions and maintaining a welcoming atmosphere (Kvale & Brinkmann, 2008; Yin, 2014). However, the interview guide approach was employed in which "topics are selected in advance, but the researcher decides the sequence and wording of the questions during the interview" (McMillan & Schumacher, 2010, p. 355). Therefore, the interviews began with one or two semi-structured questions, which allowed the interviewees to share individual responses. However, the remainder of the questions were unstructured which allowed questions to be asked about all of the predetermined topics in an order appropriate for the progression of the interviews (McMillan & Schumacher, 2010). See Appendix A and Appendix B. With this approach, it was possible to accommodate the thoughts and feelings of the interviewees. The elite interviews were audio recorded and transcribed for analysis.

In order to ensure that my questions for the elite interviews were clear, unbiased, and would elicit the responses desired for the study, the questions were piloted with a professional colleague who plans PD at another rural high school. As recommended by McMillan and Schumacher (2010), questions were noted that he did not fully understand and necessary changes were made based on his feedback before conducting the elite interviews.

Focus group. After completing the elite interviews, a focus group was conducted with teachers at the research site. "Focus groups are group discussions which are arranged to examine a specific set of topics" (Liamputtong, 2011, p. 3). The purpose of the focus group was to obtain the teachers' perspectives on the presence of Senge's five disciplines in district-provided professional development. Focus groups generally consist

of six to ten individuals whose discussion is guided by a moderator. Eight teachers at the research site participated in the focus group that was audio recorded and transcribed. The recording "ensures completeness of the verbal interaction and provides material for reliability checks" (McMillan & Schumacher, 2010, p. 360). I was the moderator of the focus group, and as such was responsible for introducing the topics, guiding the discussion, and facilitating the interactions (Kvale & Brinkmann, 2008; Liamputtong, 2011). Notes were taken during the focus group to help guide the questioning based on the responses. See Appendix C for the list of questions. McMillan and Schumacher (2010) suggest that focus groups are a more efficient way of collecting data than one-on-one interviews because there is a greater richness to the information obtained when focus group participants are prompted by each other's ideas. Another reason for deciding to do a focus group to obtain data from the teachers is to hopefully increase participation. Some individuals may find one-on-one interviews intimidating, but are more comfortable in the social setting of a focus group with others with whom they have things in common (Liamputtong, 2011).

Survey. In addition to conducting a focus group to obtain the perspectives of teachers, a survey was distributed to all teachers at the high school. While the focus group provided greater depth of understanding of the teachers' perspectives, the surveys provided a broader understanding since it included more respondents. The survey was administered electronically via Google Forms to the teachers' email addresses after the completion of the focus group. Fink (1998) says that reliable surveys have definitions that are based on experience. Information obtained from the focus group participants was

used to ensure that the definitions in the introduction to the survey would be understood by the rest of the teaching faculty.

The survey given to teachers was written, revised, piloted, and used by Park (2008) in a study involving Korean high school teachers (Appendix D). The questions were written by using the principles of each of Senge's five disciplines. The initial bank of questions underwent two rounds of validity tests that included review by both high school teachers and a learning organization expert. The survey items were initially written in English and then translated into Korean for use in Park's study. The survey was then piloted with 147 teachers and further refined. From the original 70 questions, the resulting survey consists of 35 Likert-type questions in which respondents indicate if the statement is almost never true, usually not true, sometimes true or sometimes not true, usually true, or almost always true. Exploratory factor analysis (EFA) provided necessary evidence to determine the instrument's reliability (Park, 2008). While the survey was developed to be completed by Korean high school teachers, Panagiotopoulos, Zogopoulos, and Karanikola (2018) assessed the validity of the instrument with Greek primary teachers. They concluded, "According to the results of the analyzes, it is confirmed that Park's research tool (2008) actually records organizational learning in educational environments and it could be used as a research model instrument" (p. 14). Thus, the cross-cultural validation of the survey, and the knowledge that the questions were originally written in English led to the determination that it is an appropriate tool to use in this study. Permission to use the survey in this study was obtained via email on July 9, 2018.

When formatting the online survey, Fink's (1998) suggestions were followed for surveys with many questions that look alike: "To minimize loss of interest, group questions and provide transitions that describe the format or topic" (p. 60). Because the questions are already grouped according to discipline, a definition of the discipline was included at the top of each online page and provided a page transition after each discipline. As a result of my own experiences sending out electronic surveys to teachers, two weeks were allowed for teachers to respond to the survey. A reminder was provided at the end of the first week, and one more reminder prior to the last day. In my experience and based on anecdotes from my colleagues, if a teacher does not respond to a survey within two weeks, he or she is not interested in responding and the responses will be less thoughtful.

Approval to Conduct Research

Permission to conduct research was obtained from the research site's principal on September 27, 2018. Permission to conduct research from Hamline University's Institutional Review Board was received on February 11, 2019 (Appendix E). Approved consent forms (Appendices F, G, and H) were provided for and signed by all elite interview, focus group, and survey participants.

Data Analysis

The data analysis phase of the study followed an inductive process. McMillan and Schumacher (2010) define inductive analysis as "the process through which qualitative researchers synthesize and make meaning from the data, starting with specific data and ending with categories and patterns" (p. 367). The elite interviews and focus group were transcribed so that they were in a written form more conducive to close analysis. Once

transcribed, the coding process began, which involves attaching keywords to segments of text. I employed concept-driven coding in which the codes have been determined in advance (Kvale & Brinkmann, 2008). Because the research topic specifically addresses Senge's (2006) five disciplines of a learning organization, the predetermined codes related to the five disciplines, so the frequency with which each was mentioned during the interviews and focus group could be analyzed. As Kvale and Brinkman (2009) stated, "the coding of a text's meaning into categories makes it possible to quantify how often specific themes are addressed in a text, and the frequency of themes can then be compared and correlated with other measures" (p. 203). The other measure compared with the interview data was the survey. By comparing the data from the survey, interviews, and focus group, it was determined which of the disciplines were most prevalent in professional development at the research site. Saldaña (2016) advocates for recoding after the first cycle of coding in order to refine the original categorizations. In the recoding step, the connotations were analyzed that participants used when describing the absence or presence of each of the five disciplines. In this way, their perceptions about the disciplines were analyzed.

Guskey's levels of evaluating professional development. In addition to analyzing the data for the five disciplines of a learning organization, analysis was layered by comparing the participants' responses with Guskey's (2000) five levels of evaluation of professional development which are as follows:

- Level 1: Participants' Reactions
- Level 2: Participants' Learning
- Level 3: Organization Support and Change

- Level 4: Participants' Use of New Knowledge and Skills
- Level 5: Student Learning Outcomes

Though the purpose of the study is not to evaluate the professional development at the research site, the comparison allowed for further insights that could not be obtained while exploring the five disciplines.

Due to the scope of this study focusing on Senge's (2006) five disciplines, the data collected to assess the PD according to Guskey's (2000) five levels was through participant responses, as opposed to observations or a study of student learning outcomes which are other possible data collection tools for Guskey's model. Some questions in the elite interviews and focus group focused on the five levels, while the majority of questions focused on the five disciplines. In addition, some of the survey questions related to the questions asked when assessing one of the five levels. For example, the survey question, "Teachers change their old teaching style or pattern to implement new and better approaches in educational practices" (Park, 2008) is similar to the questions asked when evaluating professional development at Level 4: Participants' Use of New Knowledge and Skills (Gusky, 2000).

Researcher Positionality

As I prepared for my data collection, I was aware of my positionality and the potential biases I may have brought to the study. Rural researcher, Michael Corbett, describes positionality as our 'embeddings' in community, school systems, and our respective positions in and out of the academy" (Bartholomaeus et al., 2014, p. 58). In addition, he believes that a researcher's location should be acknowledged in the research so that positionality is understood by future readers. As described in Chapter 1, I have

lived and worked for my entire career thus far in a rural community. My experiences living and working in a rural community have helped shape who I am and lead me to my interest in professional development and the decision to pursue a doctoral degree. My formative years, however, were not spent in a rural community. Rather, I grew up in a town of over 15,000 people that was also the location of a state university which added nearly an additional 10,000 people during the school year. Therefore, I learned to value rural community by living in it as an adult, not as a child.

I believe my rural experiences helped create camaraderie and credibility with the individuals at the research site. Halsey agrees in Bartholomaeus et al. (2014), "Rural background, rural experiences and rural stories that resonate with potential research respondents, in my experience, help build relationships and bridges" (p. 60). However, Maxwell (2013) warns that a threat to the validity of qualitative research is when the researcher selects data that fits his or her goals or presuppositions. Therefore, I continually examined my own positive viewpoints of rural education throughout the data collection and analysis process to ensure they were not influencing the conclusions. Roberts (2014) describes this work as intellectually difficult requiring researchers to know our own biases related to the study while doing the reading and research in order to learn other accounts.

Another aspect taken into account when considering my positionality regards my role in my district as the professional development coordinator. I essentially researched the results of what someone in my position does in another district. This could lead to many biases about the work being done and how it compares to the work I do in my district. Nonetheless, Anderson and Lonsdale (2014) explain, "Being attuned to our own

assumptions and ideas means valuing difference" (p. 202). Therefore, I can respect and acknowledge the differences, neither good nor bad, between the research site and my district by recognizing my own biases and examining any potential impact they might have on the study.

Assumptions

As each step of the research was planned, several assumptions were identified. To begin, it was assumed that the data collection methods would be sufficient to answer the research questions. The research regarding mixed methods, specifically in case studies, was relied on to provide the necessary background to conduct the research in a manner that would produce valid results. Another assumption was that the interviewees of the elite interviews would not have a background on Senge's five disciplines of a learning organization. Though it is not believed this impacted the results of the study, it would mildly change the content of the interviews if they already had knowledge of the disciplines as opposed to relying on explanations and definitions provided during the interviews. To manage this assumption, interviewees were simply asked at the beginning of the interview, and it was learned that the assumption was correct. It was also assumed that enough volunteer teachers would be available to hold a focus group. Hatch (2002) advises, "Teachers, as an occupational group, have relatively little power or status and often perceive themselves to be in a subordinate position in relation to education researchers" (p. 67). This may be a time when my rural background helped build a bridge, so the teachers did not feel subordinate to me as a researcher. In order to combat that feeling, Hatch (2002) suggests being clear about the intentions of the research and reiterating that any participation is voluntary. Fortunately, enough participants were

recruited for the focus group. A final assumption was that I had the necessary personal attributes to complete a case study. Yin (2014) states that case study researchers must be able to do the following:

- ask good questions,
- be a good listener,
- stay adaptive,
- have a firm grasp of the issues being studied,
- avoid biases.

I relied on my professional experience, education, and preparation to help bring these skills to the forefront as the research was completed.

Chapter Summary

This chapter provides an overview of the methodology I used in the study. To begin, the rationale for choosing a qualitative paradigm is explained. Next, the reasons for choosing case study and the main features of that research design are described. Then, the research site is explained in detail including its rurality, description of the teaching population, and factors making it a common case study. The data collection methods used are noted including elite interviews with the principal of the research site and the individuals responsible for planning professional development; a focus group with eight teachers; and a survey that was sent to all teaching staff, which had been tested and published in another study. Then, methods used to analyze the data are explained, including the comparison with Guskey's (2000) five levels of evaluating professional development which was used to gain further insights from the data. Researcher positionality is described as someone who works in a professional development role in a

rural school, and therefore the necessity to continuously evaluate conclusions for potential biases is addressed. Assumptions about the data collection methods and researcher skills are explained.

This research design is aimed to answer the primary research question: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? In addition, the research is designed to answer the secondary research question: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The following chapter describes the results of the data collection.

CHAPTER FOUR

Results

Chapter Overview

This chapter describes the results of the survey, focus group, and elite interviews that were conducted in order to answer the main research question which is as follows: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? This question was answered through the survey that was distributed to teachers, the focus group, and the elite interviews. The focus group was the primary instrument used to answer the secondary research question: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The elite interviews with the principal and professional development chairs at the research site also provided important background information regarding the professional development (PD) in which teachers take part at the research site. In addition, the elite interviews were used to compare and contrast answers between the PD planners and the PD participants.

First, the data collection methods that were used are described including the demographics of survey respondents. Then, the data is analyzed according to each of the five disciplines of a learning organization: personal mastery, mental models, shared vision, team learning, and systems thinking. Following the analysis of the five disciplines is an explanation of evidence from the data that pertains to Guskey's (2000) five levels of

professional development evaluation. The chapter concludes by examining data collected that relates to the rural setting of the research site and the teachers' perceptions of the PD delivery methods.

The data analysis followed the typological model described by Hatch (2002). This model of analysis is appropriate when the typologies are obvious prior to examining the data. Because the research focuses on Senge's (2006) five disciplines of a learning organization, the disciplines were logically chosen as the typologies. Once the typologies were determined, all data was examined focusing on one typology, or discipline, at a time, recording the main ideas on a summary sheet. First, the survey data was analyzed using a spreadsheet to find the overall average for the typology, the average for each question within the typology, the standard deviation, and the average for each demographic subgroup. Then, the written transcripts of the elite interviews and focus group were examined while listening to the audio recordings. When a statement relevant to the typology was found, it was added to the summary sheet along with any notes about tone of voice during the statement. Next, statements from the interviews and focus group were reorganized to group similar ideas. Survey results were compared with transcript statements to determine commonalities as well. After examining patterns and themes within the typology, Hatch (2002) explains the validity of the data must be checked by searching the data for non-examples of the patterns. Discrepancies between statements from teachers, professional development chairs, and administration were noted, along with discrepancies between the interview and focus group statements and the survey results.

Data Collection

In order to develop background knowledge of the professional development at the research site, the first data collection method was an elite interview with the high school principal. The semi-structured interview questions, as intended, elicited responses about the main topics for which teachers had received PD, the structures in place for PD and the amount of time allotted during the school year, and the principal's perceptions of the five disciplines in teacher professional development. Next, an elite interview was conducted with the two individuals who co-chair the high school staff development committee. Again, information received from this interview included the planning and organization of professional development for teachers.

After having information from the elite interviews, the focus group was conducted. Eight high school teachers participated: Thomas, Daniel, Michael, Greg, Vanessa, Hank, Hannah, and Ray. Their experience ranged from one year in education to 32 years in education. There was at least one representative from each of the four core curricular areas: math, science, English, and social studies. In addition, there was one representative from an elective area.

Finally, an online survey was distributed to all high school teachers. Out of 36 teachers at the high school research site, 18 completed the survey for a response rate of 50%. The survey asked certain demographic information to allow for differentiating the results during data analysis:

- Sex - 50% of respondents were female, and 50% of respondents were male.

- Experience in education - 22% had 1-4 years of experience, 28% had 4-10 years of experience, 28% had 11-20 years of experience, 5% had 21-30 years of experience, and 17% had 31 or more years of experience.
- Work experience in another school district - 61% had not worked in a district outside of the research site, while 39% have worked in a previous school district.
- Career prior to education - 89% did not have a career prior to education, while 11% had a career prior to education.
- Size of department - 11% worked in a department of 1 teacher, 17% worked in a department of 2-3 teachers, 61% worked in a department of 4-5 teachers, and 11% worked in a department of 6-7 teachers.
- Length of commute - 17% lived 0-10 miles from the research site, 28% lived 11-20 miles from the research site, 39% lived 21-30 miles from the research site, 11% lived 31-45 miles from the research site, and 5% lived more than 45 miles from the research site.

The remaining questions on the survey were grouped according to Senge's five disciplines. Respondents replied to these questions with a score of 1-5 in which the scores meant the following:

- 1 = Almost never true through professional development at the research site
- 2 = Usually not true through professional development at the research site
- 3 = Sometimes true or sometimes not true through professional development at the research site
- 4 = Usually true through professional development at the research site
- 5 = Almost always true through professional development at the research site

Data Analysis

This section presents an analysis of each discipline in the order in which they appeared on the survey. An overall average for each discipline was provided by the survey responses from all respondents for all questions. The averages are documented in Table 1.

Table 1
Discipline Survey Averages

Discipline	Park's (2008) Definition	Average
Personal Mastery	At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.	3.43
Mental Models	At the school, teachers continually reflect on assumptions about schooling; openly dialogue, share views and develop knowledge about each other's assumptions; and engage in their own work with flexibility.	3.31
Shared Vision	Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.	3.31
Team Learning	At the school, various group or team activities are encouraged to address schooling issues or teacher's professional work; teachers become committed to, skilled at, and involved in collaborative work.	3.56
Systems Thinking	Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.	3.45

Personal mastery. The survey responses returned an average score of 3.43 across all of the respondents and all of the questions pertaining to this discipline. This average

scored in the middle of the five disciplines regarding its prevalence in professional development at the research site. Six questions on the survey were related to personal mastery. Senge (2006) summarizes this discipline when he says, "People with high levels of personal mastery are continually expanding their ability to create the results in life they truly seek. From their quest for continual learning comes the spirit of the learning organization" (p. 131). The average score for each the six questions had a range of 3.06-3.78. The standard deviation for the respondents was .89. The results for each question from all respondents are documented in Table 2.

Table 2
Personal Mastery Survey Results by Question

Question	Average
All-Questions Average (n=18)	3.43
Question 1: Through professional development, teachers engage in continuous learning and reflection activities as to achieve personal growth.	3.50
Question 2: Through professional development, teachers continually work to clarify professional goals at the school.	3.44
Question 3: Through professional development, teachers view the current reality more clearly in terms of career goals.	3.33
Question 4: Through professional development, teachers have learning opportunities in teaching or other professional work	3.78
Question 5: Through professional development, teachers continually learn to bridge the gap between current reality and the desired future.	3.05
Question 6: Through professional development, teachers strive to supplement the lack of skills and knowledge in teaching and subject area	3.44

On the personal mastery questions, the lowest score from a subgroup came from teachers who had a prior career. Their responses for the personal mastery questions averaged 2.25 which is between "Usually not true through professional development" and "Sometimes true and sometimes not true through professional development". The highest score from a subgroup came from teachers who commute more than 45 miles to the research site. The average for this subgroup was 4, which indicates the statements are "Usually true through professional development". Since this subgroup only consists of one individual, the second highest subgroup score was 3.92 from teachers who work in a department of 6-7 people. The demographic subgroup results from the survey regarding the personal mastery questions are documented in Table 3.

Table 3
Personal Mastery Survey Results by Subgroup

Demographic	Subgroup	Average
Department Size	1 person (n=2)	2.83
	2-3 people (n=3)	3.50
	4-5 people (n=11)	3.42
	6-7 people (n=2)	3.92
Commute Distance	0-10 miles (n=3)	2.83
	11-20 miles (n=5)	3.60
	21-30 miles (n=7)	3.76
	31-45 miles (n=2)	2.42
	More than 45 miles (n=1)	4.00
Sex	Females (n=9)	3.31
	Males (n=9)	3.54
Teaching Experience	1-3 years (n=4)	3.46
	4-10 years (n=5)	3.23
	11-20 years (n=5)	3.33
	21-30 years (n=1)	2.00
	31 or more years (n=3)	3.89
Teaching Career in a Prior District	Yes, taught in another district (n=7)	3.36
	No, only taught at research site (n=11)	3.47
Career Prior to Education	Yes, had career in field outside of education (n=2)	2.25
	No, only worked in education (n=16)	3.52

The focus group and elite interviews also provided information regarding the prevalence of personal mastery through professional development. The principal noted that all the high school teachers attend an optional professional development day at the beginning of the year unless they absolutely cannot. He also stated that the majority of teachers, 50-60%, were engaged in self-discovery and continuous learning, adding that

more were willing to continuously learn but may not have had the ability to engage in it. The professional development coordinators believed that a few more teachers were dedicated to continual learning, estimating that it would be about 70% of high school teachers. When the focus group was asked if teachers were committed to their continuous learning, Greg quickly replied, "Yes" as two or three other focus group members nodded in agreement. Thomas added, "I think everyone that you talk to is always trying to do something different in their actual class...even from different departments, I think everyone is really into continuous learning that way". In addition, participants in both elite interviews and the focus group discussed the professional growth plans that teachers completed. The principal explained that teachers had "carte blanche" in choosing their professional growth goals, indicating that teachers could focus on their personal mastery through the selection of their goal.

Despite the comments that supported a prevalence of personal mastery at the research site, there were several statements that reveal a lack of fostering personal mastery through professional development provided by the school or district. First, although Greg said that teachers were committed to continuous learning, he qualified it by stating the following:

> I'm always looking for new labs. That's more my personal driven stuff, looking for ideas. Tweak this. Try this a different way to see if it gets better results. Do something. Change it up. For me, I'm always trying to do something like that.

Vanessa also added that she found a lot of value from conferences she attended out of the district because they were specific teaching lessons and more individualized than district-provided professional development. Greg then added that many of the science teachers

had attended "Science Suppers" hosted by a nearby university. One of the professional development coordinators also mentioned these evening PD sessions when asked how she continued to develop professionally. When the principal was asked this same question, he mentioned out-of-district principals' conferences. Next, although all of the interview and focus group participants mentioned the professional growth plans, it was clear that these were not part of professional development at the school. The professional development coordinators stated that those goals were "not tied in" to PD, that they "don't deal with that," and were an "administrative initiative".

The focus group was asked, "Do you feel like you're provided with professional development time to work on your personal professional goals?" Daniel responded that "We have to develop it on our own...I don't think we ever really get that time". Thomas added, "I think people just look at it when they have to do it". Finally, the elite interviews revealed that not all teachers were necessarily comfortable with some of the actions required in working towards personal mastery. One of the professional development coordinators said, "What holds me back from doing something new or different would be myself or just my comfort zone". This was echoed by the principal who said he was shocked by the number of teachers who lacked the confidence or know-how to research new strategies to try in their classroom.

In conclusion, the survey results indicate that professional development at the school sometimes fosters personal mastery. The interviews and focus group reveal that teachers and administration believed the majority of high school teachers were committed to their continuous learning. However, much of this continuous learning was outside the district. Even the professional growth goals were separate from the work done by the

professional development committee. All interviewees indicated that they developed themselves professionally outside of the school's PD which is supported by the assertion of Senge et al. (2012), that "good teachers themselves are continuous and lifelong learners with their knowledge of their subject—and of the craft of teaching—evolving throughout their lifetimes" (p. 17). Despite the lack of attention placed on personal mastery through the school-provided PD, teachers did not make negative comments about this reality. No one mentioned that they wished they had time through PD to work on their professional goals. They did not list a lack of time to work on professional goals as a weakness or area of improvement. Thus, its lack of prevalence did not seem to be of high importance to teachers at the research site.

Mental models. The average scores for all respondents and all questions related to mental models was 3.31. This was the second lowest of the five disciplines. On the survey, eight questions pertained to mental models, which are "deeply held internal images of how the world works" (Senge, 2006, p. 163). As a discipline, organizations should implement procedures to unmask these hidden assumptions in order to address reality and move the organization forward (Senge, 2006). The average score for each of the eight questions ranged from 3.06-3.5. The standard deviation for the respondents was .83. The results for each question from all respondents are documented in Table 4.

Table 4
Mental Models Survey Results by Question

Question	Average
All-Questions Average (18 respondents)	3.31
Question 1: Through professional development, teachers often reflect on assumptions about schooling activities with other teachers to ensure that they are in line with educational principles.	3.44
Question 2: Through professional development, teachers inquire about the appropriateness of their own course or program with respect to the goals of schooling.	3.17
Question 3: Through professional development, teachers learn and change as a result of students' reactions during teaching.	3.50
Question 4: Through professional development, teachers often use the significant events of the school or classroom to think about their own beliefs about education.	3.44
Question 5: Through professional development, teachers change their old teaching style or pattern to implement new and better approaches in educational practices.	3.06
Question 6: Through professional development, teachers actively explore assumptions and ideas with each other about educational practices.	3.22
Question 7: Through professional development, teachers are highly aware of how their own beliefs and assumptions affect educational practices.	3.28
Question 8: Through professional development, teachers at the school can effectively explain their own assumptions underlying their reasoning.	3.39

Teachers with 21-30 years of experience, of which there was one respondent, rated mental models the lowest with an average of 1.75. The subgroup with more than one respondent that rated mental models the lowest was teachers who commute 31-45 miles. Their responses averaged 2.19 which is between "Usually not true through professional development" and "Sometimes true or sometimes not true through

professional development". Teachers who have been teaching 31 or more years rated mental models the highest out of the subgroups with an average of 4.08. This average is just above "Usually true through professional development". The demographic subgroup results for the mental models questions are documented in Table 5.

Table 5
Mental Models Survey Results by Subgroup

Demographic	Subgroup	Average
Department Size	1 person (n=2)	3.13
	2-3 people (n=3)	3.08
	4-5 people (n=11)	3.32
	6-7 people (n=2)	3.75
Commute Distance	0-10 miles (n=3)	2.92
	11-20 miles (n=5)	3.58
	21-30 miles (n=7)	3.55
	31-45 miles (n=2)	2.19
	More than 45 miles (n=1)	3.75
Sex	Females (n=9)	3.22
	Males (n=9)	3.40
Years of Teaching Experience	1-3 years (n=4)	3.06
	4-10 years (n=5)	3.20
	11-20 years (n=5)	3.19
	21-30 years (n=1)	1.75
	31 or more years (n=3)	4.08
Teaching Career in Prior District	Yes, taught in another district (n=7)	3.16
	No, only taught at research site (n=11)	3.41
Career Prior to Education	Yes, had career in field outside of education (n=2)	2.63
	No, only worked in education (n=16)	3.54

In addition to the survey revealing that mental models is the second to last discipline in regard to prevalence, the elite interviews and focus group also revealed that little is done through professional development at the high school to address the hidden assumptions teachers have about teaching and learning. Nonetheless, one of the professional development coordinators described an example of addressing mental models during their elite interview. She discussed that her professional learning community (PLC) was working as a team of tenth grade teachers to implement interventions to help the tenth grade students. "We talk about problems we see in the tenth grade, or issues. They're not reading or whatnot. And then we try to look for things to implement. That's been going really well for us." Through the teachers' cycle of identifying concerns, determining strategies, implementing those strategies, and assessing their impact, the PLC members are able to bring mental models to the surface for examination. One other example of addressing mental models was mentioned by the principal who stated that his approach is to name the assumption, or stereotype, and push past it. "If there's not a response to that, 'So what are we doing to do differently?'" Thus, there was little evidence through the interviews and focus group to support a strong prevalence of mental models in professional development that relates to the results from the survey.

Despite the lack of prevalence in PD, all of the interviewees identified underlying assumptions teachers held about teaching and learning at the high school. Some of these were brought up when specifically asked about them, and some were made clear through responses to other questions upon the transcript analysis. One of these assumptions was that students today do not do homework. The high school principal first identified this as

a stereotype teachers had about students. Then, in the focus group, while responding to a different question, Greg stated that the ninth graders were "so horrible at getting homework done. I'm just banging my head against a wall". This idea was reiterated by Daniel when specifically asked about assumptions: "I think myself and other teachers who have been here 15 plus [years], we assume that there is more of kids that are doing less". Related to students doing less homework, Daniel added that students today are less motivated. This was also identified by the principal as an assumption the high school teachers had. Thomas, a teacher within the first five years of his career, specifically addressed motivation as an issue with students in non-advanced classes: "When you have non-advanced classes, you already go into it assuming that it's going to be much more difficult to get them to do almost anything". Another student subgroup identified as having an assumption made about them was rural students. Greg stated that the mentality among teachers was "Oh, these guys are the troublemakers, the ones that don't care and are screwing around in the classroom". Hank and Daniel agreed that there are differences between the rural and non-rural students at the high school. However, Hank also clarified that there were exceptions to the rural stereotype.

Besides the mental models in place regarding students, there were also assumptions in place regarding the way teachers work with each other and administration. First, one ingrained assumption in the school was that younger teachers are believed to be more motivated and have more valued ideas than more experienced teachers. This was evident in comments made during both elite interviews as well as the focus group. The high school principal answered a question during his interview about evidence he had that teachers are learning from their professional development. He

excitedly provided an example about a senior English teacher who had been "turned on to teaching in a just a crazy way". As he described this teacher, he added, "I mean, I think he's eligible [for retirement]". His tone during this part of the interview implied he was surprised by an experienced teacher getting motivated to try new things in his classroom. The professional development coordinators implied the assumption as well when one stated, "We have a pretty young staff now that seem really motivated". Her counterpart continued with, "I think that that's changed in the last three years probably just because there's been staff turnover". When asked later about the reason for the turnover, they replied that it was due to retirements. In the focus group, the topic arose when participants were responding to a question about how they deal with conflict among colleagues. Michael, a teacher with almost 32 years of experience, introduced the idea saying, "I think there's an attitude that the younger staff, the new staff, are listened to because they understanding things better...There's almost a mentality I think sometimes of like, 'They'll be gone soon. Then it'll be my school'". Greg, another teacher with almost 32 years of experience, agreed and added that administration does not want "any kind of questions being asked. The young ones don't necessarily ask questions". Despite the assumption that younger staff are more motivated and receptive of new ideas, the survey data is somewhat contradictory. In fact, survey respondents with 31 years of experience or more was the subgroup with the highest average for three of the five disciplines indicating a stronger perception of the high school as a learning organization.

Another mental model held by teachers was that ideas from administration, consistently described as "top down" ideas, are not to be well-respected. The high school principal explained teachers' enthusiasm for trying new ideas by stating that it depended

on whose idea it was. “Staff had come up and said, ‘If you propose it,’ meaning superintendent or principals, ‘we’re going to fight it right away.’” In the focus group, Vanessa, an 11-year teacher at the research site with 18 years of teaching experience overall, explained that department meetings were most valuable to her because they began at a base level “rather than from on high telling us what to do”. When describing a professional development topic that had been a focus from administration and had started being implemented at lower grade levels, Greg said, “I’d probably be fighting it if it happened here”. Later in the focus group discussion, participants were asked to identify weaknesses of PD at the high school. Daniel noted a weakness stating, “Often, activities don’t have a lot of buy-in because they seem to be coming from top down”. This theme was reiterated again when the focus group discussed the process of making changes to their curriculum. Michael said, “I think some changes are easy; some are difficult. I think it depends on who thinks of the idea.” He then described an idea from administration that he said “looks good on paper,” but was not very practical.

To summarize the data collected on mental models, the survey results suggest professional development at the research site sometimes includes opportunities to examine hidden assumptions. However, the interviews and focus groups failed to identify a strong prevalence. Nonetheless, there were several mental models about teaching and learning identified either directly by the interview participants or discovered through the transcript analysis. These mental models pertained to the relationship between teachers and students, teachers and their colleagues, and teachers and administration. The participants did not indicate a desire to address these assumptions through professional development, and therefore the lack of prevalence does not seem to impact the teachers’

perception of the school-provided PD. However, Senge (2006) asserts, “Those models, if unexamined, limit an organization’s range of actions to what is familiar and comfortable” (p. 176). Thus, it would likely benefit the school’s capacity to move forward if professional development activities focused on addressing mental models were implemented.

Shared vision. Falling just behind mental models with the average score for all respondents and all questions is the discipline of shared vision. Like mental models, the average rounds to 3.31, but to differentiate, shared vision scored 3.309 while mental models was 3.312. While very close, shared vision is the lowest of the five disciplines. Seven questions on the survey pertained to shared vision which, according to Senge (2006) “is the answer to the question, ‘What do we want to create?’ They [shared visions] create a sense of commonality that permeates the organization and gives coherence to diverse activities” (p. 192). Developing a shared vision is important because without it, there is an overwhelming tendency to follow the status quo. The range of average scores for each of the seven questions was 3.17-3.5. The standard deviation for the respondents was .99, the highest among the five disciplines. The results for each question from all respondents are documented in Table 6.

Table 6
Shared Vision Survey Results by Question

Question	Average
All-Questions Average (18 respondents)	3.31
Question 1: Through professional development, teachers and staff together build the school's vision and goals.	3.33
Question 2: Through professional development, teachers develop their personal goals to align with the whole school vision or goals.	3.33
Question 3: Through professional development, teachers align personal class or teaching goals with the school vision and goals.	3.17
Question 4: Through professional development, teachers feel comfortable in sharing ideas with other teachers about the school vision.	3.50
Question 5: Through professional development, teachers are committed to a shared vision for the future of school.	3.28
Question 6: Through professional development, teachers agree on the principles necessary to achieve the school vision.	3.33
Question 7: Through professional development, teachers consider the impact on the school vision and goals when changing educational practices.	3.22

On the shared vision questions, the lowest subgroup average, 1.86, was from teachers with a prior career. This average is between "Almost never true through professional development" and "Usually not true through professional development." This is the lowest subgroup score out of all the subgroups for all the disciplines. The highest subgroup average, 4, was from teachers in a department of 6-7 people. This average is equal to "Usually true through professional development." The demographic subgroup results from the survey regarding the shared vision questions are documented in Table 7.

Table 7
Shared Vision Survey Results by Subgroup

Demographic	Subgroup	Average
Department Size	1 person (n=2)	3.00
	2-3 people (n=3)	3.86
	4-5 people (n=11)	3.09
	6-7 people (n=2)	4.00
Commute Distance	0-10 miles (n=3)	3.24
	11-20 miles (n=5)	3.23
	21-30 miles (n=7)	3.61
	31-45 miles (n=2)	2.36
	More than 45 miles (n=1)	3.71
Sex	Females (n=9)	3.06
	Males (n=9)	3.56
Years of Teaching Experience	1-3 years (n=4)	3.54
	4-10 years (n=5)	3.09
	11-20 years (n=5)	3.26
	21-30 years (n=1)	2.29
	31 or more years (n=3)	3.48
Teaching Career in a Prior District	Yes, taught in another district (n=7)	3.12
	No, only taught at research site (n=11)	3.43
Career Prior to Education	Yes, had career in field outside of education (n=2)	1.86
	No, only worked in education (n=16)	3.58

Though shared vision averaged the lowest of the five disciplines on the survey, the responses still indicated that teachers at the high school felt shared vision was sometimes addressed through professional development. During the elite interview with the professional development coordinators, they each stated that a strength of the school-provided PD was that it was run by staff. They mentioned that the PD committee

meetings are staff run, that staff provide a lot of input about what they want to see in their PD through surveys. By using that input about PD needs, the committee is better able to plan opportunities that address the vision of the teachers. Specifically, the coordinators discussed that they used feedback from teachers to determine PLC topics. Then, teachers selected one of the topics on which to focus and PLCs were formed. The principal echoed that work had been done to build shared vision around PLCs. For two years in a row, the school board funded 20 teachers each year district-wide to attend an out-of-district professional development training to learn how to make PLCs most effective. He said that the school was "trying to get as many people there because it's been transformational for those who have". So far, almost one third of teachers in the district have attended the three-day summer training. Therefore, although this experience was out of the district, having many teachers attend was a way to build shared vision around PLCs. In addition to PLCs, the principal was asked if teachers are enthusiastic to try new ideas. In his response, he explained that teachers needed to see the purpose and know the reason behind it indicating he understood the importance of developing a shared vision.

While the elite interviews provided a few examples of shared vision being a part of professional development, the focus group gave a description of a formal process the teachers went through to develop a shared vision. Building off of each other's answers as they responded to a question regarding shared vision, they explained that the goal was to complete the sentence stem, "When students leave [the research site], they will be able to…" Through the process, they recorded answers to the following questions:

- What do our students do very well?
- What do we want them to know?

- Where are some areas that we could improve?
- Where could students improve?

Then, teachers color-coded the various responses based on their level of agreement with the statement. Though none of the teachers in the focus group could specifically recite a vision statement that resulted from the activity, Ray stated, “I think we all have an idea of what it should look like”. Vanessa added, that to her knowledge, the main concepts from the activity were used by the professional development committee to plan topics for future PD activities.

Despite examples of times when shared vision had been addressed through professional development, there were many statements throughout the elite interviews and focus group that indicated a shared vision was lacking. In fact, many of these were in direct contrast to other statements made that supported the development of a shared vision. For example, the PD coordinators spoke of teacher input being used to develop PLC topics, and the principal described the transformational nature of the PLC professional development opportunity many teachers had. However, the coordinators and the principal stated that PLCs are not meaningful to some teachers. The principal described it as a “check the box activity”, whereas one of the coordinators explained that, for some, it’s “just another hoop”. The other coordinator added that though input had been used to create the PLC topics, some teachers didn’t find a topic in which they were interested. Nonetheless, they were required to choose a topic from those offered, and those individuals became frustrated.

Another statement showed a discrepancy with another account. Though the principal recognized that teachers need to see a purpose and the reason in order to try new

ideas, several teachers in the focus group said the building leadership team, a group of decision-makers other than the professional development committee that also includes teachers, is "not open to any kind of questioning, or 'Why is this happening?' or 'What's going on?'" This sentiment, however, was also challenged by the staff development coordinators who stated that an area of improvement for professional development at the high school was that there are individuals who ask "'Why are we doing this?' 'We should do this instead.' But they're not willing to put in their time. They're not willing to participate". Therefore, administration recognized the importance of knowing the purpose, teachers felt that questions about why things are being done are not welcomed, and the PD coordinators believed those asking questions about purpose aren't willing to participate. Thus, the idea of a shared vision is being discussed in some ways, but there is an obvious disconnect between all parties. Finally, the teachers in the focus group recalled a shared vision building process, but the professional development coordinators described that process as an administrative push: "There's been definitely a top down push to have that common initiative, common approach for student learning from the superintendent down to the building administrators."

The data collected on shared vision, both through the survey results and the interviews, indicate that there are some examples of the high school attempting to develop a shared vision through professional development. However, there are often actions that are counterproductive to developing one. Because this discipline has the highest standard deviation of all the disciplines, it seems there is less agreement among teachers about the prevalence in professional development regarding shared vision. Unlike the two previous disciplines, personal mastery and mental models, which did not

seem to impact teachers' perceptions of professional development, there does seem to be more negative perceptions among teachers regarding the lack of shared vision. This can be seen most clearly through the comments made about top-down decision making which were detailed in the analysis of mental models. Thus, there may be a relationship between the low prevalence of this discipline in district-provided professional development and some of the negative perceptions regarding the PD at the high school.

Team learning. While shared vision had the lowest average of the five disciplines on all questions from all respondents, team learning had the highest average with 3.56. Seven questions on the survey pertained to team learning, which is "the process of aligning and developing the capacity of a team to create the results its members truly desire" (Senge, 2006, p. 218). There are three components of team learning. The first is that team members must approach complex problems intelligently. Second, the team members must operate in a coordinated fashion, being cognizant of each other's actions and complementing those actions. The third component of team learning is for members to bring the team learning skills to other teams of which they are a part in order to spread potential learning throughout the organization (Senge, 2006). The average scores for each of the seven questions on the survey ranged from 3.22-3.89 with a standard deviation of .91. The standard deviation was the second highest of all the disciplines. The results for each question pertaining to team learning from all respondents are documented in Table 8.

Table 8
Team Learning Survey Results by Question

Question	Average
All-Questions Average (18 respondents)	3.56
Question 1: Through professional development, teachers feel free to ask questions of other teachers or staff regardless of gender, age, and professional status at the school.	3.89
Question 2: At the school, group or team works are used in teacher professional development.	3.89
Question 3: Through professional development, teachers are treated equally in team or committee activities.	3.61
Question 4: Through professional development, teachers share information across course subjects and grade levels with other colleagues.	3.33
Question 5: Through professional development, teachers believe that sharing information or knowledge through team activities is useful for solving complex school problems.	3.50
Question 6: Through professional development, teachers respect other colleague's ideas and opinions by viewing them from their colleague's perspective.	3.44
Question 7: Through professional development, teachers participate in open and honest conversations to share their best educational practices.	3.22

The one survey respondent who lives 45 miles or more from the research site rated team the learning the highest of all the subgroups at 4.71. This average is between "Usually true through professional development" and "Almost always true through professional development". The next highest subgroup was male teachers who averaged team learning at 3.83. The lowest subgroup average, 2.50, was from teachers with a prior career. This average is between "Usually not true through professional development" and "Sometimes true or sometimes not true through professional development". The

demographic subgroup results from the survey regarding the team learning questions are documented in Table 9.

Table 9
Team Learning Survey Results by Subgroup

Demographic	Subgroup	Average
Department Size	1 person (n=2)	3.36
	2-3 people (n=3)	3.62
	4-5 people (n=11)	3.55
	6-7 people (n=2)	3.71
Commute Distance	0-10 miles (n=3)	3.33
	11-20 miles (n=5)	3.54
	21-30 miles (n=7)	3.76
	31-45 miles (n=2)	2.64
	More than 45 miles (n=1)	4.71
Sex	Females (n=9)	3.29
	Males (n=9)	3.83
Years of Teaching Experience	1-3 years (n=4)	3.71
	4-10 years (n=5)	3.54
	11-20 years (n=5)	3.33
	21-30 years (n=1)	2.71
	31 or more years (n=3)	3.81
Teaching Career in a Prior District	Yes, taught in another district (n=7)	3.49
	No, only taught at research site (n=11)	3.60
Career Prior to Education	Yes, had career in field outside of education (n=2)	2.50
	No, only worked in education (n=16)	3.54

The survey results indicated team learning had the highest prevalence of the five disciplines and was supported by the elite interviews and focus group. The focus group was asked to list the different teams that are in place within the school. They identified

the building leadership team, the staff development committee, curriculum teams, department teams, and PLCs. Therefore, the high school had teachers meeting in teams for a variety of purposes. Ray explained a strength of the teams at the high school being that "you see a lot of input from various people". The principal explained that time to work in teams was also protected during more traditional faculty meetings that meet on a variety of topics. With his interview being in mid-March, he said they had had about 120 minutes of faculty meetings so far during the school year. He estimated that 95 of those minutes had been reserved for teachers to work in teams, which is nearly 80% of the time. Another positive example of team learning was the opportunity to use PD funds to support in-district collaboration. The professional development committee managed a pool of money for teachers to attend out-of-district conferences. However, in recent years, the money began to be used to compensate time spent out of the contracted work day collaborating with colleagues. This use of funds was explained by both the principal and PD coordinators. One of the coordinators said she had used that funding to collaborate with other teachers and, therefore, had not felt the need to attend any out-of-district conferences.

The focus group and interviews also revealed details regarding team learning in PLCs in particular. During the focus group, Hank focused on the teaming in PLCs describing them as a place where teachers can talk to others they don't normally talk to or see every day. Other statements were made by the PD coordinators and the principal. The professional development coordinators clarified that every member of the PLC team is equal, without a designated facilitator. One coordinator described her experience within her PLC: "That's been going really well for us. I'm actually learning something in staff

development." The principal acknowledged that after the PLCs have done their work throughout the year, they share with the larger group to celebrate progress. The coordinators also included this information and were positive while explaining the opportunity to share what they worked on with all teachers.

All groups and individuals interviewed were asked how well the teams work together. The professional development coordinators both agreed that, for the most part, the teams work well together and they have received positive feedback about allowing time for the teams to work. The principal said that at first, team learning was challenging because "they'll look at each other for a long time". However, he added that they had been getting better and that he'd been "seeing some momentum pick up". When teachers were asked this question, several individuals commented that they had never had an issue of working well with their teams. However, Vanessa and Thomas, who are in the same department, mentioned they had some internal conflict within their department during the current school year as they were asked to collaborate on a class for the first time. However, Senge (2006) does not say that conflict is necessarily bad for team learning. In fact, he says that it may be important when practicing how to learn as a team. Developing skills in team learning includes "encouraging team members to raise the most difficult, subtle, and conflictual issues essential to the team's work" (p. 242).

As with the previous disciplines, the interviews, which included examples of the prevalence of team learning, also included discrepancies of such statements. First, though the teachers were able to list several different learning teams that occur within the school, the principal stated that the majority of the time on staff development days is spent in a large group. Next, both the PD coordinators and the principal remarked that the

effectiveness of different teams varies. Though some are productive and focused on learning, others are not as strong. The teachers then described the building leadership team as actually having a hierarchy and therefore not functioning as a team despite its name. Interestingly, there was a comment made by the principal contradicting team learning. He said that in PLCs, there had been "senior staff who were really not interested in sharing with others. However, this is not supported by the survey results in which teachers with 31 or more years of experience had the highest average for the following question: "Through professional development, teachers share information across course subjects and grade levels with other colleagues." Another discrepancy regarding team learning was related to the amount of time teachers had to meet in teams. When asked if teachers had enough time to meet collaboratively, the principal quickly responded that they did. However, when this same question was asked of the PD coordinators, they both immediately answered, "No".

When analyzing the data collected for this discipline, there was a focus on responses from teachers in a department of one person. Although they may have had the opportunity to participate in other teams, they were without a department team and had a different structure to their curriculum team. Unsurprisingly, the survey results showed that teachers in a department of one averaged team learning lower than teachers in departments with other people. Also, when discussing departments with the focus group, Hannah, a teacher in a department by herself, explained that department team meetings were "just the opposite" of most valuable to her because there is no one else who teaches the same content. The professional development coordinators also recognized the challenge of team learning for teachers in a department alone, which they referred to as

"lone wolves". One of the coordinators explained that PLC topics are sometimes department or grade-level specific. When asked if there are ever teachers who do not find a PLC topic they want to work on, she said, "Because we're a smaller school, it ends up being the lone department...when you have lone wolves that don't fit into a specific category, then they get frustrated". This is a unique challenge for rural schools, which have a higher amount of teachers in a department by themselves (Howley & Howley, 2005), trying to foster team learning.

When it comes to teachers' perceptions of professional development in relation to team learning, there is a positive interrelationship. The teachers in the focus group agreed that professional development activities focused on team building and team learning were the most valuable. Hank specified that department teams were the most valuable to him because "you're really talking about what's in your world". Several teachers in the focus group also described team building activities that get them out of their comfort zone as being most valuable.

To conclude the data analysis on team learning, the evidence collected shows it to have the highest prevalence of the five disciplines in professional development at the high school. Teachers find PD activities that address team learning to be most valuable. In addition, there are many different teams within the school that allows team learning to take place for many different purposes. Nonetheless, there are some instances in which team learning is hindered including inconsistencies in the effectiveness of different teams and less team learning opportunities for teachers in a department of one. The perception of teachers regarding team learning was very positive. They found it valuable and spoke highly of their opportunities to work in teams.

Systems thinking. Systems thinking, the fifth and final discipline, "is the conceptual cornerstone that underlies all of the five learning disciplines" (Senge, 2006, p. 69). The seven questions on the survey that pertained to systems thinking asked teachers to consider how professional development at the research site addressed the interrelatedness of ideas within the school system. Senge et al. (2012) define systems thinking as providing "a different way of looking at problems and goals—not as isolated events but as components of larger but less visible structures that affect each other" (p. 124). Of the five disciplines, systems thinking averaged the second highest for all questions from all respondents with a score of 3.45. The range of averages for each of the seven questions was 2.78-4.06. The lowest scoring question on the survey was "Through professional development, teachers consider the impact on other teachers when dealing with a student discipline problem". Through the interviews, it was clear that student discipline had not been a focus of professional development at the research site in recent years that could explain the low score for this question. When this low scoring question is removed from the survey results, systems thinking becomes the highest scoring discipline instead of the second highest. The standard deviation is .79 which is the lowest of the five disciplines. The results for each systems thinking question from all respondents are documented in Table 10.

Table 10
Systems Thinking Survey Results by Question

Question	Average
All-Questions Average (18 respondents)	3.45
Question 1: Through professional development, teachers consider the different needs and abilities of students when developing lesson plans.	4.06
Question 2: Through professional development, teachers consider the impact on their results to the inside and outside of the school when changing educational practices.	3.50
Question 3: Through professional development, teachers consider the impact on other teachers when dealing with a student discipline problem.	2.78
Question 4: Through professional development, teachers regard educational issues as a continual process rather than with a snapshot or event.	3.50
Question 5: Through professional development, teachers attentively link the current schooling with students' career pathways.	3.28
Question 6: Through professional development, teachers consider consistency with the policy of the governments and educational acts when changing and creating school rules.	3.50
Question 7: Through professional development, teachers consider the effect on students when dealing with school challenges.	3.56

The lowest-scoring sub group was teachers who commute 31-45 miles to the research site with a score of 2.79 which is between "Usually not true through professional development" and "Sometimes true or sometimes not true through professional development". The highest-scoring sub group was teachers who have 31 or more years of teaching experience whose average score for this discipline was 4.24. This average is between "Usually true through professional development" and "Almost always true through professional development". The demographic subgroup results from the survey are documented in Table 11.

Table 11
Systems Thinking Survey Results by Subgroup

Demographic	Subgroup	Average
Department Size	1 person (n=2)	3.57
	2-3 people (n=3)	3.57
	4-5 people (n=11)	3.38
	6-7 people (n=2)	3.57
Commute Distance	0-10 miles (n=3)	3.52
	11-20 miles (n=5)	3.49
	21-30 miles (n=7)	3.53
	31-45 miles (n=2)	2.79
	More than 45 miles (n=1)	3.86
Sex	Females (n=9)	3.13
	Males (n=9)	3.78
Years of Teaching Experience	1-3 years (n=4)	3.36
	4-10 years (n=5)	3.29
	11-20 years (n=5)	3.26
	21-30 years (n=1)	3.00
	31 or more years (n=3)	4.24
Teaching Career in a Prior District	Yes, taught in another district (n=7)	3.16
	No, only taught at research site (n=11)	3.41
Career Prior to Education	Yes, had career in field outside of education (n=2)	2.86
	No, only worked in education (n=16)	3.52

The survey results indicated that systems thinking was the second most prevalent of the disciplines in professional development. The evidence collected in the elite interviews and focus group provided some support for those results, but also included many contradictory examples. One example of a structure in place to foster systems thinking was PLCs. The principal explained that they were purposefully not

departmentalized in order to get teachers working with others they may not work with as often. This ability to work with teachers that one does not normally work with was noted as a strength of the PLCs by the focus group. As a result, teachers had the opportunity to see the bigger picture of the school system and the principal noted that "I heard repeatedly that 'Oh, I never realized…'". Another way PLCs were structured to allow teachers to see the whole instead of the parts was by having all PLCs come together at some point to share what their goal was, what they worked on, and the results.

While PLCs had some role in developing systems thinking, teachers also felt that the large group professional development sessions helped them get a better understanding of what was happening in the school as a whole. Thomas discussed that large group PD activities gave him the opportunity to see people in the building he does not often talk to or know well. Hannah said, "I'm thinking of the staff development days where we gather up as a whole being more valuable to know what's going on more so across the building than department meetings because I'm a one-person department". In the interview with the principal, he stated that large group sessions start out with sharing good news so people have an idea of what is happening in other departments or grade levels.

In addition to PLCs and large group PD, the focus group revealed a few other structures in place to foster systems thinking. First, any changes in curriculum must go to the District Advisory Committee for Curriculum and Standards (DACCS) that Daniel described as having a "finite, specific set of instructions". By going through a process and a committee, any curricular changes will take place with the whole system being considered. Second, Ray explained that he gets a different perspective when the speakers are brought in by the school that is helpful in understanding students. Finally, Vanessa

expressed that the structure of the school itself, being smaller than many schools, allowed teachers to have a better idea of what is going on throughout the school. She explained that in a larger school, teachers may only eat lunch with their department. However, teachers have more opportunities to talk to others outside of their department in a school their size.

While the structures detailed above suggest there are many opportunities for teachers to develop systems thinking, many statements showed that teachers do not have an understanding of the bigger picture of the school as a whole. For example, those responsible for planning professional development, the coordinators and the principal, did not believe teachers knew what was happening outside of their department. Even the coordinators did not know who the one-person department members met with during certain collaborative times indicating that they do not have a clear picture of the whole either. One of the coordinators did express, however, that the goal is to move towards a better understanding of the whole system, but that "it's islands for a little while". Another example, brought forth by Greg during the focus group, was that the scheduling of professional development meetings may indicate a lack of systems thinking. He stated that he has so many meetings that he is unavailable to students who may need assistance before and after school. In addition, he felt the value of morning PD meetings may be compromised by the fact that "everybody's just trying to get to their rooms, getting ready for their 30 kids coming into their class".

The most telling data regarding the discipline of systems thinking was likely the statements from the teachers themselves about how much they felt they knew about what was happening throughout their school. Hank said, "I only know what goes on in my

department. I don't know what goes on in other departments." In a later part of the focus group discussion, Daniel said, "I don't know a lot about the struggles, trials, and tribulations of other departments". Ray agreed and added that he gets more information about what's happening in the school from the students as opposed to teachers. Despite having little knowledge about the daily patterns of his colleagues, Daniel asserted, "I'm aware of how everybody is working very hard and doing the same kinds of things I'm doing". Interestingly, teachers were very forthcoming about not knowing what was going on in the school as a whole. However, when asked about what was most valuable and least valuable in professional development at the high school, many focus group participants agreed that smaller team meetings were more valuable than the large group PD sessions, even though they recognized the large group activities as providing more of the "bigger picture". Therefore, a lack of systems thinking did not seem to diminish their perception of professional development.

In summary, systems thinking was fostered in professional development through many of the structures in place that allowed teachers to see different perspectives or work with people outside of their own department. Nonetheless, many teachers expressed a lack of knowing what goes on outside of their own specific departments. This was also the perception of the principal and PD coordinators. The survey, however, showed that systems thinking was the second most prevalent discipline. Thus, even though the teachers admitted not having a big picture idea of the school, perhaps they had a better idea than they thought. This makes it difficult to determine if their perception of professional development is impacted by the prevalence of systems thinking because the comments from the focus group did not align closely with the survey results. However,

the teachers did not express negative feelings with a lack of systems thinking. In fact, as they explained that they did not know what happened in other areas of the school, they did so matter-of-factly and did not place blame of their lack of understanding on anyone but themselves.

Guskey's levels of professional development evaluation. After the data was analyzed for each of Senge's (2006) five disciplines, it was analyzed according to Guskey's (2000) five levels of professional development. Once again, the survey results were inspected for questions that matched those asked in the five levels of evaluations. Then, the elite interviews and focus group transcripts were reviewed to gather information for each of the five levels.

Level 1: Participants' reactions. At this first level, the goal is to determine whether participants thought "their time was well spent and the experience was worthwhile" (Guskey, 2000, p. 95). During the focus group, participants were specifically asked how they felt about the quality of professional development at the research site. Hannah, who is in her first year of teaching, said she did not have anything to compare it to, so at that point it was all valuable. Daniel explained that he does not remember what happened during the last professional development experience unless he is reminded by colleagues, which he says, "says it all for me". Greg gave the high school professional development a C+. Thomas stated that he enjoys the PD opportunities with the high school teachers specifically, but added that he does not enjoy the PD activities that take place with the whole district. Ray, who has experience working in another school district, believes the professional development at the research site is much better when compared with his former school because teachers have much more of a say in it. Vanessa, who

taught in another state, explained that professional development at the research site was much better than at her former school as well. Thus, although some of the participants felt professional development at the research site was stronger than at other schools, most responses indicated that teachers are neither wholly satisfied nor dissatisfied with the professional development.

Level 2: Participants' learning. After determining the level of satisfaction, Guskey (2000) says it is important to assess if the professional development "led to any change in participants' knowledge, skill level, and, in some cases, their attitudes or beliefs" (p. 121). The first survey item pertaining to personal mastery provided a response to this level of evaluation. The item said, "Through professional development, teachers engage in continuous learning and reflection activities as to achieve personal growth". The average for all respondents for this question was 3.5 which is between "Sometimes true and sometimes not true through professional development" and "Usually true through professional development". One of the professional development coordinators stated that she was learning something through her PLC work during the school year. However, both the coordinators and the principal stated that PLCs are sometimes a "check the box" activity or a hoop to jump through, so it is unlikely that all teachers are learning through that PD structure. The principal was specifically asked about evidence he has that teachers have learned something from their professional development. He stated that teachers talk to him about what they have learned and what they are trying. He discussed one PLC in particular and how each member of the team had talked to him individually about what they had learned during the year so far. Based on the survey responses and examples from the interviews, it is clear that some teachers

have learned from their professional development experiences at the research site. However, the teachers in the focus group did not specifically discuss new knowledge they have gained from PD, so it's likely that not all teachers have gained much new knowledge.

Level 3: Organization support and change. This level of evaluation addresses what the organization, in this case, the research site, has done to foster the implementation of knowledge learned during professional development by providing resources, protection from intrusions, openness to experimentation and alleviation of fear, collegial support, principal's leadership and support, recognition of success, and provision of time (Guskey, 2000). The interviews and survey results provided significant evidence of factors in the organization that support professional learning.

First, the principal stated that the district and the professional development committee had allotted $75,000 over two years for teachers to attend a professional development opportunity on improving the effectiveness of PLCs. In addition to this funding, the PD coordinators explained that money is set aside from professional development to allow teachers to use professional leave time to collaborate with colleagues. The allocated money provided an opportunity for teachers to attend the same PD session from which they can build shared vision, and compensated the time for teachers to work with one another. The next organizational support is providing protection from intrusions. The principal specifically addressed this topic and said that over the past few years, he had focused on reducing the amount of time he talks at any PD activity in order to allow teachers more collaboration and work time. The third organizational support is providing an environment that has an openness to

experimentation and alleviation of fear. According to Guskey (2000), “Improving schools have cultures that are open to new ideas and approaches, support experimentation, encourage continuous improvement, and work to alleviate the fear and uncertainty associated with the change” (p. 156). During part of the elite interview with the professional development coordinators, they discussed their feelings about trying new things as classroom teachers. One of them remarked, “I think we’ve been given a lot of lenience on what we want to do as long as we’re covering the standards”. The other coordinator added that she had never felt pressure that would discourage her from trying something different. She then said, “What holds me back from doing something new or different would be myself and just my comfort zone”. However, she specified that she did not fear pushback from administration or colleagues.

While the first three factors of organizational support provided ample evidence of their presence, the fourth support had more mixed results. When assessing professional development for the factor of collegial support, it is important to consider how well teachers feel their efforts are valued by their colleagues and whether they have the opportunity to collaborate and share with their colleagues (Guskey, 2000). On the survey, two items related to collegial support: “Through professional development, teachers participate in open and honest conversations to share their best educational practices,” and “Through professional development, teachers feel free to ask questions of other teachers or staff regardless of gender, age, and professional status at the school”. The average for all respondents for the former item was 3.22, and the average for the latter was 3.89. Both of these averages are between “Sometimes true or sometimes not true through professional development” and “Usually true through professional

development". The interviews also provided evidence indicating a presence of collegial support. Through the elite interviews with the principal and PD coordinators, it was revealed that teachers had the opportunity to observe one another through peer mentoring and peer coaching. In addition, one of the coordinators described the school as "a positive, supportive environment". During the focus group, Thomas said that everyone was always trying to do something different in their classes. Greg asserted that his colleagues were committed to continuous learning. Though there were many positive examples of collegial support, the coordinators and principal all recognized that there were a few teachers who were not actively trying to grow in their practice. However, all also agreed with one of the coordinators who explained that "the percentage is much less than even last year or two years ago". Finally, the principal provided an account of a teacher who wanted to try a new approach in her classes. Her department met with the principal to share some concerns about this new approach, but pointed out, "We don't not support it". Although there were some examples that suggested collegial support may not be overly exuberant at all times, there were more indicators of its presence than absence.

The fifth aspect of organizational support is the principal's leadership and support. Guskey (2000) asserts that a principal's behaviors "determine in large part teachers' perspectives toward professional development and their commitment to improvement" (p. 158). When asked about how he continued to develop himself professionally, the principal said he read professionally and attended various conferences, including the Minnesota Principals' Academy that consists of fifteen to eighteen different sessions over a two-year period. He added that he brought the information learned there back to staff. The principal was also asked if teachers would say he values their opinion.

He stated that he thought they would because he had asked for it and tried hard to listen to their opinion. One of the professional development coordinators supported this viewpoint when she remarked that they saw the principal more as a colleague than an administrator on the professional development committee and that teacher ideas were at the forefront in that context.

Next, the aspect of recognizing success is important because it shows teachers that their efforts are appreciated and "reinforces the mission of the organization" (Guskey, 2000, p. 161). During the elite interviews with the coordinators and the principal, all commented that the principal begins professional development sessions by asking for good news from the group. He stated that sometimes he is aware of certain successes, but other times he would ask teachers to recognize another colleague. The principal also mentioned that he had greeting cards that say, "Every day, great things happen". He said he periodically filled out the cards with good things he saw from teachers and then distributed them.

The last aspect regarding how organizations can support professional development is provision of time. This can be addressed by providing ample time for professional development and for implementing what was learned during PD opportunities (Guskey, 2000). This aspect of organizational support had more evidence of its absence than its presence. First, one of the PD coordinators explained how she felt after many PD activities: "That's a great idea. I want to do that. I have all these ideas. I need to go to my classroom and teach." Thus, she did not feel she had enough time to implement what was learned. This feeling was echoed by Thomas during the focus group who spoke specifically about the PLCs saying they seemed like an afterthought. "We just

don't meet very often. There's not a ton of time devoted. I think when we do PLCs in the morning, too, so many people are trying to get their stuff ready for the day." Finally, although the principal stated that he believed teachers had enough time to collaborate with each other, the professional development coordinators quickly rejected this assertion.

In conclusion, the research site provides many of the organizational supports necessary for effective professional development. The area in need of most improvement is provision of time. Despite this weakness, however, all of the other aspects had multiple examples establishing that the organization does support effective professional development.

Level 4: Participants' use of new knowledge and skills. Assessing the extent to which participants have implemented strategies learned through professional development is the next level of evaluation. Guskey (2000) underscores the importance of this level because "one cannot improve the learning for all or even most students without first improving the learning and instructional practices of all or most teachers" (p. 181). Survey respondents considered the statement, "Through professional development, teachers change their old teaching style or pattern to implement new and better approaches in educational practices". The average score for this question was 3.06 which is closest to the response, "Sometimes true or sometimes not true through professional development". During the interview with the professional development coordinators, one of the coordinators identified practices she had been implementing that were learned through her PLC. The other coordinator stated that she had learned a lot about a specific tool in her PLC, but had not yet had time to implement it. The principal, during his

interview, discussed that teachers had not been asked to implement anything regarding one of their focus topics for professional development that year. However, he stated that they will be asked to in the future. At the time of the interview, they had only been asked to learn about it. Therefore, beyond the statements from the PD coordinators about their own implementation, it was difficult to determine the level of implementation for other teachers when they were not yet at that stage.

Level 5: Student learning outcomes. Because the purpose of this study was to analyze the presence of Senge's five disciplines of a learning organization in the research site's professional development, evidence was not collected regarding student learning outcomes. However, the Minnesota Department of Education (2018) provides information regarding student performance on statewide achievement tests. For 11th grade math, the percentage of students at the research site who were proficient on the statewide test was 1% below the state average in 2016, tied with the state average in 2017, and 5.1% above the state average in 2018. For 10th grade reading, the percentage of students at the research site who were proficient on the statewide test was 2.8% below the state average in 2016, 2% above the state average in 2017, and 1.2% above the state average in 2018. Thus, student performance on statewide achievement tests in both math and reading have improved from below the state average to above the state average over the span of three years. Although there had been improvement in student achievement, Guskey (2000) asserts that it is difficult to link professional development efforts to student outcomes. Nonetheless, "Improvements in student learning have never been observed in the absence of professional development" (p. 208). According to that

rationale, participants at the research site must have engaged in effective professional development at some point in order to increase proficiency on statewide tests.

Rurality. The rural context of the primary research question necessitated examining the data collected from a rural lens. Howley and Howley (2005) contend that teachers in rural schools are more likely to experience professional isolation and a lack of collaboration as a result of having content areas with only one teacher. Fifty percent (50%) of the high school teaching staff completed the survey, and of those, two respondents taught in a department of one. For the discipline of personal mastery, teachers in a department of one had the lowest average when compared with all the other department size subgroups. Teachers in a department of one also had the lowest average of the department size subgroups for shared vision and team learning. Thus, for three of the five disciplines of a learning organization, teachers in a department of one perceive a lower prevalence in professional development than teachers in departments of two or more teachers.

Further insight on the professional development experience of teachers in a department of one was gained from the focus group, in which one of the participants, Hannah, was the only teacher of her content area. As other members of the focus group discussed how valuable department meetings were for their professional development, Hannah stated that the opposite was true for her. She explained that during department professional development time, she met with the other single-member departments. “We share what’s going on in our different departments, but we can’t get very specific. We meet very briefly and then disperse; go our own ways and then work independently, which I do a lot of already.”

Unfortunately, it was not only department meetings, which have a specific professional development focus, where teachers in departments of one had difficulty fitting in. During the elite interview with the professional development coordinators, it was revealed that those teachers were also often the ones who got frustrated when choosing a PLC topic. PLC topics are often related to a specific department or grade level. Because teachers in single-member departments do not work with a specific grade level and do not have other content-area teachers to work with, they end up having to choose a PLC topic that may not have related well to their professional interests or needs. Additionally, the principal revealed that large groups of teachers have attended PLC professional development out of the district for the previous two years. The out-of-district PD promotes Dufour et al.'s (2006) PLC structure. Because of the model's emphasis on common assessments, this presents a challenge for single-member departments that do not have the opportunity to use common assessments.

Although the previous examples suggest a negative aspect of professional development due to its rural nature, there were also more positive results. When discussing systems thinking with the focus group and teachers' ability to see the bigger picture, Vanessa explained that teachers at the research site have a better idea of what is going on than teachers in a larger school. In addition, Howley and Howley (2005) say that rural schools, due to their smaller teaching staff, have more opportunities for collaboration. This assertion is supported by the survey results, in which team learning was the most prevalent of the five disciplines.

Finally, during the focus group, participants discussed the rurality of their students. When the focus group was first asked about assumptions, or mental models, that

teachers had about student learning, the first assumption participants mentioned was about "farm kids". Greg stated that those students were often thought of as troublemakers. Other teachers in the focus group agreed with him. After this discussion, participants began referring to the farm kids, those who wore cowboy boots and flannel shirts, as rural students. They said that a majority of their students were rural, and most were easy to identify because of their dress and vernacular. It was clear from the discussion that the teachers have several mental models related to their rural, farm-living students and their behavior in school. However, as previously discussed in the data analysis of mental models, there is little done through professional development to address these stereotypes.

Professional development delivery methods. Though the research questions are not related to methods used to deliver professional development at the research site, the broader discussion of the site's professional development overall justifies an examination of the teachers' perceptions on this focal point. By far, the most prevalent delivery method of PD in the United States is the workshop (Sparks & Loucks-Horsley, 1989; Wei et al., 2009; Desimone et al., 2002; Garet et al., 2001). The focus group and interview participants did not indicate the prevalence of workshop-type PD, but teachers identified varied perceptions of the delivery method. Daniel stated that PD delivered through workshop often does not have a lot of buy-in because it is seen as a "top-down" message. This feeling was related to workshop PD with in-district presenters. However, at different times throughout the focus group, Vanessa, Daniel, and Ray all describe a different positive professional development experience that included the workshop delivery with an out-of-district presenter. This contrasts with Sparks and Loucks-

Horsley's (1989) findings that teachers preferred peer-led trainings. However, it is congruent with their assertion that workshop can change teaching practice, but not for all teachers at all times. Since each of them, Vanessa, Daniel, and Ray, all remembered a different PD experience that the rest of the group did not seem to recall, it is clear that those out-of-district presenter workshops impacted some teachers, but not all.

Focus group participants indicated a positive perception of PD delivered through small group collaboration. Though not all of the small group PD is delivered through what the research site determines are PLCs, the department meetings in which teachers participate adhere to some of the tenets of PLCs. Wei et al. (2009) explain that within a PLC, there is a collective responsibility to improve student learning and that teacher practice is analyzed. Thomas stated that his department meetings provide a chance to learn from his colleagues and that the focus is "more concrete things that you're actually going to start doing in your classroom right away". Hank also spoke positively about the small-group department meetings explaining that "you're really talking about what's in your world". Greg also agreed that department meetings are most valuable.

Finally, although the focus of this research study is PD provided by the research site, some of the most positive statements about professional development regarded activities and events that take place out of the district. High school teachers are more likely than elementary teachers to attend out-of-district PD (Wei et al., 2009). Focus group participants stated that out-of-district professional development provide specific lessons for one's content area, are more individualized, and provide ideas that can be used in the classroom the next day. Vanessa even stated that her out-of-district professional development was the most valuable PD in her opinion. The reasons given for

valuing out-of-district PD align with Lucilio's (2009) contention that high school teachers place the highest importance on content-specific professional development experiences.

Thus, examining the participants' responses for their perceptions of different PD delivery methods indicates that teachers prefer small-group led sessions, out-of-district PD, and out-of-district presenter workshops. Workshop-style sessions led by in-district presenters received the least positive comments. Nonetheless, the analysis indicates that Lucilio's (2009) conclusions about high school teachers preferring content-specific PD is actually a stronger indicator of satisfaction than the delivery method. The teachers who remembered a specific workshop from an out-of-district presenter used in the information from the training in their practice. The favorable comments about small-group PD and out-of-district PD related to the individualized, content focus of each.

Chapter Summary

This chapter reports the results of the data collected for the study. To begin, the analytical approach is explained, followed by a review of the data collection methods and a description of the participants. Next, the data from the elite interviews, focus group, and survey is reported. The first section of the data analysis examines each of the five disciplines of a learning organization. Evidence regarding the prevalence of each discipline in district-provided professional development is examined as it serves to answer the primary research question: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? Then non-examples of the prevalence are acknowledged for each discipline. The data analysis also includes evidence of teachers' perceptions of the

professional development in order to answer the secondary research question: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school?

After analyzing the data for the five disciplines, the results of the data collection are examined to reveal evidence related to Guskey's five levels of professional development evaluation. For each of the five levels, responses from the interviews, focus group, and survey are used to determine the effectiveness of the professional development according to the respective level. The data is then scrutinized through a rural lens to determine which aspects of the data pertained to teachers in rural schools. Finally, indicators of teachers' perceptions of different professional development delivery methods are explored, concluding that high school teachers prefer content-specific PD. The following chapter offers conclusions drawn from the results and their connections to the literature. Limitations and delimitations of the study are also discussed. The chapter concludes with the implications of the study.

CHAPTER FIVE

Conclusion

Chapter Overview

This chapter draws conclusions from the results of the data collection that are described in chapter four. First, the conclusions discussed answer the primary research question: Which of Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? In addition, connections are made between the data results and existing research. Next, conclusions are drawn from the results in order to answer the secondary research question: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? Following the discussion of the primary and secondary research questions, Guskey's five levels of evaluating professional development are revisited with inferences about the overall assessment of professional development at the research site. Then, limitations and delimitations of the research study are addressed along with explanations for each of them. The chapter concludes with recommendations for future professional development at the research site as well as implications for future research related to the study.

Discussion of Results and Connection to Literature

Primary research question. The data collection methods of the elite interviews, focus group, and survey aimed to answer the primary research question: Which of

Senge's five disciplines of a learning organization are most prevalent in a rural high school's district-provided professional development? According to the survey results and the examples provided in the interviews, team learning is the most prevalent of the five disciplines. However, all of the disciplines averaged between 3.31 and 3.56, which places them all between "Sometimes true or sometimes not true through professional development" and "Usually true through professional development" as seen in Table 12.

Table 12
Senge's Disciplines Sorted by Survey Average

Discipline	Average
Shared Vision	3.31
Mental Models	3.31
Personal Mastery	3.43
Systems Thinking	3.45
Team Learning	3.56

Because the range of scores is so narrow, each of the disciplines merits a discussion. The following section is organized from the discipline with the lowest average on the survey to the discipline with the highest average on the survey.

Shared vision. When fostering the discipline of shared vision, teachers work together to develop an image of the desired future that will be created by all members of the organization. Professional development, therefore, "should include sessions where attendees co-create a view of how the school should evolve" (Senge et al., 2012, p. 403). The focus group participants described a process they used to build a shared vision. However, in order for shared visions to move an organization forward, they must have staying power for years, propelling the participants through continual learning (Senge et

al., 2012). As Ray said in the focus group, the vision created from that process had not been revisited for one or two years, thus indicating a lack of shared vision.

There may also be another reason the process for developing a shared vision did not result in teachers perceiving a higher prevalence. Though the process involved the teachers and their ideas, the professional development coordinators stated that creating a shared vision was an administrative push. Senge et al. (2012) asserts that mandatory visions from administration are not sustainable. Teachers had a part in the process, but it is clear the process itself was still seen as an administrative initiative that did not gain buy-in from teachers.

Despite the lower average, there were some practices in place upon which the high school can continue to develop their shared vision. When the focus group discussed the shared vision process, Vanessa said that the ideas generated from that activity were used to determine PLC topics. The professional development coordinators reiterated this by explaining that they used feedback from staff to select the PLC topics. Thus, each PLC is at a developmental level of a shared vision since teachers choose which PLC to join and are committed to exploring that topic. Darling-Hammond (2010) found that when professional development allows teachers to identify what they want students to learn, teacher practice and student outcomes improve. High school teachers in particular are more motivated when their suggestions for improving student learning are used to plan professional development (Lucilio, 2009). Therefore, the research site can continue to develop momentum for the creation of a shared vision by increasing motivation and focusing small groups of teachers on topics in which they are engaged.

Mental models. "Sometimes I'll name it, and we'll push right past it." This was the only evidence of how mental models were addressed in professional development from the two elite interviews and the focus group. However, "drive-by staff development" (Senge et al., 2012, p. 400) is not sufficient to change assumptions teachers hold about their organization. Therefore, it is easy to understand why the average for mental models was among the lowest of the five disciplines on the survey. Senge (2006) says that mental models can be simple generalizations. Thus, something that is described as simple may not seem to warrant much attention in professional development. However, Darling-Hammond (2010) cautions that unexamined assumptions will lead teachers to form incorrect conclusions about what is happening in their classrooms. Senge (2006) takes it a step further and says that not only do mental models affect how people think, but they also shape how people act.

Throughout the data collection, it was clear that the mental models of teachers at the high school were impacting their actions. First, the teachers in the focus group addressed the stereotypes of rural students, or students who lived on farms. They were known to be troublemakers, and were easily identifiable by their appearance and speech. Senge et al. (2012) assert that "teachers of public schools today unwittingly operate out of a deficit perspective when teaching poor children" (p. 399). Though rural students are not necessarily poor students, a parallel can be drawn between the two based on the comments from the teachers.

Another mental model that seemed pervasive in the school regarded the extent to which ideas from younger staff were taken seriously compared to ideas from more experienced teachers. Subtle comments were made by the professional development

coordinators about how the staff was more motivated than in previous years due to retirements. The principal expressed surprise at a teacher who was eligible for retirement and was still trying new things in his classroom. The focus group said it seemed like younger staff were listened to more than experienced teachers. Thus, an assumption made by teachers and administration was that newer staff are more motivated and likely to engage with new ideas. The danger in this thinking is that it can lead to discounting good ideas because they are not brought forth from an individual who is expected to have good ideas. Furthermore, the survey data indicated that the most experienced teachers, those with 31 years of teaching or more, actually had a more positive assessment of professional development at the high school with their average being the highest of the years of experience subgroups for all disciplines except shared vision. Without taking steps to examine assumptions like this one, an organization may be limited in its actions and ability to move forward (Senge, 2006).

***Personal mastery*.** If the research question did not specify personal mastery through district-provided professional development, this discipline may have had different results regarding its prevalence. The principal, PD chairs, and most of the teachers in the focus group made positive comments about professional development they attended outside the district as part of their continuous professional learning. This aligns with the findings that high school teachers are more likely to attend out-of-district conferences or workshops and be reimbursed by the district for the cost (Wei et al., 2009).

The high school teachers had an expectation to work on a professional growth goal, but this was seen as an initiative coordinated by administration and not under the

professional development umbrella. Senge (2006) cautions leaders, "No one can be forced to develop his or her personal mastery" (p. 161). Senge et al. (2012) say that providing time for teachers to reflect on their personal visions will prevent their aspirations from being repressed by administrative mandates. The focus group participants were very clear that time was not given to specifically work on their personal goals. Despite the lack of PD time to work on these personal goals, the principal was able to provide multiple examples of teachers who had made significant changes in their practice as a result of their work on their professional growth plans. Sparks and Loucks-Horsley (1989) say that when teachers determine their own goals and action steps to achieve those goals, they are engaged in individually-guided staff development. Thus, the creation of the professional growth goals is propelling some teachers into developing their personal mastery through individually-guided PD.

Although there was not much set-aside time for teachers to embark on a path of personal mastery, all of the teachers in the focus group, the PD coordinators, and the principal stated that the majority of teachers were committed to continuous learning. Senge et al. (2012) recognizes that good teachers are lifelong learners who are always increasing their knowledge of their content and teaching practice. High school teachers in particular are eager to learn strategies that will help students better understand their content (Lester, 2003). This was clear through the focus group as they mentioned that department-focused professional development was most valuable to them because it was specific to what they teach in their classrooms.

Overall, it is understandable how personal mastery averaged in the middle of the five disciplines for prevalence. Though time was not provided for teachers to specifically

focus on their administration-mandated professional growth plans, teachers themselves were interested in continuous learning. In addition, they had opportunities to work in small groups on department or content-related topics that research shows is a motivating factor for high school teachers.

Systems thinking. The discipline of systems thinking obtained the second highest average on the survey, yet there was very little evidence of this discipline being prevalent in high school professional development in the interviews and focus group. "Systems thinking is a discipline for seeing the 'structures' that underlie complex situations" (Senge, 2006, p. 69). Senge et al. (2012) explain that systems thinking is focused on understanding the interrelatedness of the many components in a school. However, in both elite interviews and the focus group, interviewees responded that teachers did not have a good understanding of what was going on outside their own department. In fact, a focus group participant did not know about a conflict occurring in his own department until it was brought up by his fellow department members during the focus group. The PD coordinators did not know who teachers from one-member departments met with during professional development activities when other teachers met as departments. One focus group participant said he knew more about what was going on in the school by talking to students as opposed to teachers. Senge et al. (2012) recognize the issue of there being "too little communication in many schools across grade levels and fields of study" (p. 403). Another participant said his department was told by one authority figure to focus on the ACT test standards when planning his curriculum and another authority figure told them to use the state standards. Clearly, systems thinking is also necessary when aligning curriculum to ensure the same requirements are being met (Senge et al., 2012).

Thus, there is ample evidence that the discipline, systems thinking, could use improvement at the high school. However, it does not explain the high score it received on the survey. Without follow up interviews with every person who completed the survey, it would be difficult to definitively determine the reason for the disconnect. One possible explanation is a misalignment between the systems addressed in the survey items and the systems addressed in the interview questions. The survey items related closely to how teachers addressed student systems. For example, "Through professional development, teachers consider the different needs and abilities of students when developing lesson plans," and, "Through professional development, teachers attentively link the current schooling with students' career pathways". However, the questions in the interview were based on systems between colleagues such as, "To what extent do teachers consider their colleagues when making decisions about student learning?" and "How do your professional development activities help teachers see the big picture of the school as a whole, as opposed to focusing on their one classroom or department?" Thus, it is plausible that professional development at the high school helped teachers think about the various systems affecting students in their classroom, but not systems affecting the faculty as a whole.

Team learning. The discipline of team learning averaged the highest of the five disciplines on the survey, and was the only discipline to score above a 3.5 that indicates a preference toward the response, "Usually true through professional development". Not only did the survey results reveal the highest prevalence, but the evidence from the focus group interviews mirrored the same prevalence.

One of the team learning opportunities discussed frequently by all of the interviewees was department-specific PD. Many focus group participants stated that meeting with departments was the most valuable professional development. Research supports this sentiment as Lucilio (2009) found that high school teachers feel that professional development experiences related to their content area are most important. Another team structure in the professional development at the high school was PLCs. One of the PD coordinators explained the things her PLC had studied and implemented throughout the school year up to the point of the interview. She spoke positively about what had been done and how much she was learning through the experience. This aligns with Stewart's (2014) assertion that when committed groups of teachers participate in an ongoing study, the depth of understanding results in a change in practice.

In addition to the small group team learning that took place, teachers also expressed finding value in team bonding activities. They described silly games that were played and said they appreciated the chance to see and work with colleagues with whom they do not often have the opportunity. Senge et al. (2012) agree that professional development activities related to team learning should include development of esprit de corps in addition to their focus on improving instruction.

Of course, there was one area in which team learning lagged at the research site. Teachers in a department of one experienced team learning differently from their colleagues. The average score for team learning on the survey for this subgroup was the lowest in the department-size demographic. This is a frequent issue of rural schools in which the only teacher in his or her content area may face professional isolation (Howley & Howley, 2005). The survey item that scored the lowest for the one-member department

subgroup was as follows: “Through professional development, teachers participate in open and honest conversations to share their best educational practices.” This item was scored a full half point below the next closest subgroup in the demographic. It is possible that these teachers did not experience as much sharing of ideas because there was no one else in their content area with whom to exchange ideas. Interestingly, for this team learning survey item only, the average score increased as the department size increased. Therefore, it is possible that the larger the department is, the more sharing of ideas occurs. Furthermore, the research site is investing significant time and money in professional development for a PLC model that relies on larger department sizes to be most successful. The considerable focus on common assessment in the Dufour, Dufour, Eaker, and Many (2006) design is problematic for single-member departments.

In addition to the overall survey averages and interview data, closely examining the subgroup averages from the survey provides further confirmation of the disciplines’ prevalence rankings. The lowest subgroup average is a 2.00 or below for each of the three lowest overall disciplines: shared vision, mental models, and personal mastery. This is not true for the two highest disciplines, systems thinking and team learning, which do not have a subgroup average lower than 2.50. In addition, the highest subgroup average of the three lowest disciplines is 4.08, whereas the highest subgroup average of the two highest averaging disciplines is 4.71. Therefore, though the overall averages are within .25, the lowest subgroup average and highest subgroup average for the two highest disciplines overall are more than .50 higher than the lowest and highest subgroup averages of the three lowest disciplines overall. This data is documented in Table 13.

Table 13
Lowest and Highest Subgroup Averages

Discipline	Lowest Subgroup Average	Highest Subgroup Average
Shared Vision	1.86	4.00
Mental Models	1.75	4.08
Personal Mastery	2.00	4.00
Systems Thinking	2.79	4.24
Team Learning	2.50	4.71

In conclusion, the primary research question regarding which of Senge's five disciplines of a learning organization is most prevalent in a rural high school's professional development was answered. Through both the interview data and the survey data, team learning is most prevalent. Howley and Howley (2005) determined that rural schools often benefit from the cooperation that occurs among staff due to the smaller numbers. Thus, it is possible the rural setting was a factor in the results. Nonetheless, the degree to which each of the other disciplines is prevalent aligns with the available research. If there is low prevalence in the data, the literature provides reasons for those results. The one anomaly is the discrepancy between the survey and interview data for systems thinking. However, the difference between the survey items and interview questions is a likely explanation for that difference.

Despite there being a discipline that is clearly more prevalent than the others based on both survey and interview data, the survey data indicated that all of the disciplines fall within the same range of scores between "Sometimes true and sometimes not true through professional development" and "Usually true through professional development". Therefore, it is important to note that none of the disciplines fall below the 3.00 average. This indicates that all of the disciplines are more present than absent in

professional development at the research site. One of the goals of the study was to determine if the disciplines would be present without planning for their implementation. The survey results show that they are. However, none of the disciplines averaged above a 4.00 which would have suggested a much more significant presence. Therefore, in the case of this rural high school, without planning for their implementation, Senge's (2006) five disciplines of a learning organization are more present than absent, yet none of them are "usually" present in professional development.

Secondary research question. The secondary research question is as follows: How does the prevalence or absence of Senge's five disciplines of a learning organization impact teachers' perceptions of district-provided professional development in a rural high school? The focus group was the primary data collection method to determine teachers' perceptions of the professional development. Based on their responses, the answer to the secondary question is that it varies. One may expect that if a particular discipline is high in prevalence, then teachers would also perceive that discipline as being especially important or valuable. Likewise, if a particular discipline has low prevalence, one may assume a sense of frustration around its absence, or a lack of perceived unimportance. However, the perceptions did not follow a trend with respect to the prevalence.

Despite the lack of a direct relationship between prevalence and perception throughout the results, it did bear out that the discipline with the highest prevalence, team learning, also had the most positive perception by teachers. Erdem, İlğan, and Uçar (2014) determined that job satisfaction was positively impacted by the development of team learning within a school. Teachers in the focus group consistently described aspects

of team learning when they discussed their most valuable and most memorable professional development experiences.

The discipline that provoked the most negative perception from teachers was mental models. However, teachers did not specifically connect the negative perception to professional development, but towards other systems at the school. Mental models is the second lowest discipline in terms of prevalence according to the survey, and the interviews and focus groups did not provide much additional evidence. However, the mental models that were in place in the school, unaddressed or addressed in a very minimal way, appeared to have strongly affected the attitudes and actions of teachers at the school. They expressed frustration when discussing that younger teachers' opinions were valued more than those of experienced teachers. They admitted a lack of motivation to participate in professional development experiences they viewed as "top down" initiatives. They stated that students who dressed and spoke in a rural or farm style were seen as troublemakers. When left unexamined, teachers can develop self-reinforcing mental models (Senge et al., 2012). If teachers believe students will be troublemakers, their classroom management will be affected and may lead students to behave in ways more in-line with how they are being addressed by teachers. This will only increase teachers' frustration.

For the remaining disciplines, shared vision, personal mastery, and systems thinking, teachers' perceptions of the school or their professional development experiences did not seem to be impacted by their prevalence. Teachers spoke matter-of-factly about the lack of a shared vision, which received the lowest average on the survey. They discussed that there had been a process through professional development to create

a shared vision, and that it had not been revisited since that activity. However, they did not appear frustrated or disappointed by this. For personal mastery, which was rated in the middle of the five disciplines according to the survey, teachers spoke positively about teachers' commitment to their professional learning, but did not list those opportunities among the most valuable experiences. Conversely, they recognized that they were not allocated time to work on their professional growth goals, but did not indicate a strong desire to be given more time either. Finally, systems thinking, which had a higher prevalence on the surveys as compared to the interviews and focus group, also seemed to have little impact on teachers' overall perception of professional development. Teachers explained that they had little knowledge of what occurred in other departments or areas of the school in which they were not directly involved. They also noted that they appreciated professional development activities that allowed them to work with teachers with whom they ordinarily did not see. However, they did not express strong positive or negative feelings during either of those discussions.

In conclusion, though the discipline of greatest prevalence, team learning, had the most positive impact on teacher perceptions of professional development, there was not a direct relationship between the prevalence in professional development and the perception of professional development for the remaining disciplines. However, the second lowest discipline according to the survey, mental models, did negatively impact perceptions towards other aspects of the school such as the value of colleagues' ideas and the behavior of rural students. One other point of interest regarding the perception of professional development involves the survey respondent who commutes 45 miles or more to the research site. For the commute distance demographic, he or she scored each

discipline the highest when compared to the other subgroups. Thus, this individual believes there is a higher prevalence of the disciplines than many other respondents. This may tie to the teacher's overall job satisfaction as he or she chooses to commute a great distance to work.

Guskey's levels of evaluation. The primary and secondary research questions did not pertain to the evaluation of the research site's professional development, but to the prevalence of Senge's five disciplines of a learning organization and the effect they had on teachers' perceptions of district-provided professional development. However, data was collected during the elite interviews and the focus group that related to Guskey's (2000) five levels of evaluating professional development:

- Level 1: Participants' Reactions
- Level 2: Participants' Learning
- Level 3: Organization Support and Change
- Level 4: Participants' Use of New Knowledge and Skills
- Level 5: Student Learning Outcomes

The purpose of analyzing the data according to Guskey's (2000) levels of evaluation is to compare the evaluation levels to the prevalence levels of Senge's disciplines.

The first level of evaluating professional development is participants' reactions. The focus group participants' reactions indicated that they believed the professional development at the high school is not the worst, but not the best. One participant stated that the PD experiences within the high school were more beneficial than experiences with this whole district. This aligns with the literature in which Wallace (2014) reported that nearly 60% of rural teachers felt that district-level professional development was the

least effective. Thus, what was gleaned from the participants is that professional development at the research site is better than professional development at the district level, better than professional development in a participant's previous district, and better than professional development in a participant's district in a previous state. Nonetheless, some felt that the activities were not memorable and averaged a C+ rating. Thus, one may describe the assessment at the first level as average.

The second level of evaluation is participants' learning. This level of assessment is used to identify strengths and weaknesses related to the PD content, format, and organization. Most of the participant learning identified through the elite interviews and focus group related to PLCs. The principal, PD coordinators, and focus group participants all described different PLC members who discussed the learning that had taken place in their groups. Thus, the PLC structure of a long-term study in a small group of a particular topic of the teachers' choice appears to be the professional development experience that led to the most participant learning. This information relates to the prevalence of team learning, which was the highest of the disciplines. In a PLC, teachers are learning as a team, and the evidence showed that most of the learning through professional development at the research site occurred in PLCs. Therefore, the high prevalence of team learning aligns with overall participant learning. However, the teachers, professional development coordinators, and principal all indicated other teams in which teachers met during professional development. These teams were not mentioned by the participants as ones that produced much learning. The professional development coordinators can use this information to identify the strengths of the PLCs that lead to learning, and the areas for improvement for the other teams.

Organization support and change is the third level of evaluation. The interviews and focus group indicated that this is one of the strongest levels of evaluation. Most of the components of this level were in place at the high school. Teachers felt there was collegial support, there were informal systems in place to recognize success, steps had been taken to protect professional development from intrusion, teachers identified an openness to experiment with new ideas in their classes, and the principal provides leadership and support to the professional development committee. The area that could use the most improvement is provision of time. Teachers felt that they do not have enough time to collaborate with each other and some professional development experiences were described as being an afterthought.

Guskey's (2000) fourth level of evaluating professional development is participants' use of new knowledge and skills. Although some evidence of this level was provided by the principal and PD coordinators, the teachers did not mention many examples. A possible explanation for this is that a major professional development focus for the school was still in the learning stage and not the implementation stage. Therefore, evidence of implementation would have been premature.

Finally, the fifth level of evaluation is student learning outcomes. Guskey (2000) says, "For many policymakers and educators alike, this is professional development's bottom line" (p. 246). Though data on this level was not collected during the interviews, the Minnesota Department of Education (2018) reports show that over the course of the three years prior to this research study, the statewide standardized achievement scores in math and reading increased from below the state average to above the state average. There is not enough information to determine that professional development at the high

school caused the increase in test scores; however, it is one indicator the school could use in their own evaluation of professional development.

After examining information gathered for Guskey's (2000) five levels of evaluating professional development, it appears that professional development at the research site was average. The evidence indicates that the third level was a strength, and more information was needed to fully assess the fourth and fifth levels. Within the third level, organization change and support, the collegial support aspect had ample evidence. This component includes opportunities for collaboration and sharing ideas. Therefore, it closely relates to Senge's (2006) discipline of team learning. Since team learning had the highest prevalence, it is foreseeable that Guskey's collegial support was also strong.

What can be gained from examining the data with Guskey's (2000) levels of evaluation is an understanding of the relationship between the five disciplines and the levels of evaluation at the research site. The prevalence of the five disciplines was slightly above average. Likewise, the evaluation of the professional development was also average, if not slightly above due to the overall strength of level three. A future research topic may be to see if the relationship remains in another school or district.

Limitations and Delimitations

Limitations. During the data collection, one limitation may have been the reactivity of the interviewees and focus group participants to the researcher's influence. The way questions were asked undoubtedly influenced the respondents in some way (Maxwell, 2013). This limitation was partially addressed by asking open-ended questions that did not force a choice of response. Another limitation may have come from using a focus group instead of one-on-one interviews for teacher perspectives. By selecting

teachers who wanted to participate and who could meet for the desired length of time all at the same time and place, the research was inevitably limited to certain viewpoints. There may not have been as wide of a range of perspectives as if separate interviews had been scheduled or certain people were specifically asked to participate. However, the format of the focus group, allowing participants to build off each other's responses, resulted in rich data required for the study.

Further limitations were considered during the data analysis. These were, perhaps, limitations with case study design itself. Yin (2014) explains that researchers will often make inferences based on the data collected during a case study. However, the researcher must consider if all explanations for the phenomenon have been explored. Since the researcher is only looking at certain aspects of the organization during a given period of time, there may be other factors responsible for the phenomenon that were outside the scope of the case study. This necessitated being cautious not to make inferences during the data analysis that may have had an alternative explanation. Inferences were limited to those that could be completely contained within the scope of the research specifically examining Senge's five disciplines in district-provided professional development. At times, an inference was specified as one possible explanation in order to clarify that it should not be taken as a definitive answer. Finally, from the rural perspective, Roberts (2014) understands that the job of a researcher is to make meaning, but cautions that he or she must "acknowledge that these meanings are entwined with their different rural contexts and communities and that they are produced differently on a variety of scales" (p. 145). It was necessary to be careful, therefore, not assume that what was true of the rural high school where the research was conducted is also true of other rural high

schools. The research is a case study, and therefore the results can only be directly applied to that case. All rural should not be treated the same (Roberts, 2014). Thus, a limitation of the research was that the knowledge gained from it cannot be used to make assumptions about other rural high schools' professional development.

Delimitations. The research question delimited the study in several ways. First, the study only examined the professional development provided on-site by the high school or district. One reason for this was that all teachers had access to that professional development. All professional development teachers encounter would include different masters degree programs, out-of-district conferences attended individually, online personal learning networks, and more. Since the teachers would have very different experiences with these, it would have been difficult to draw any conclusions. Secondly, one of the goals of the study was to provide knowledge that the research site, and potentially other rural high schools, could use in planning their professional development programming. To meet that goal, the study kept focus on district-provided PD. Another delimitation was using a high school research site as opposed to an entire district or pre-kindergarten-8th grade. This decision was made based on my knowledge as the researcher. Since I primarily work with high school teachers, my knowledge base regarding PD topics and trends is greater for that level of education. In addition, there is not an extensive body of research on secondary teachers' professional development, and this study will hopefully add to that specific literature. Overall, the research questions delimited the study to produce reliable, valid results based on the shared experiences of the participants.

Other delimitations occurred in the methodology. I delimited the length of time teachers had to respond to the survey. Two weeks were planned. However, the length of time was adjusted to three weeks based on the number of responses. Placing a time limit on the survey hopefully encouraged teachers to respond before they forgot about it. In addition, if left open indefinitely, the study would have been drawn out for an unnecessarily long time and later responses may have been based on different professional development experiences that occurred since the first respondents completed the survey. The study was also delimited by the choice not to use observation which is a common data collection method for some case studies. This was done for two reasons. First, due to my position as a full-time educator in another district, it was not feasible to observe all district-provided PD at the research site because it often occurred at the same time as my own school's professional development. Secondly, though it may have been helpful to see what took place during the professional development, the focus was more on how the teachers thought about what happened. In order to obtain information on their thoughts and feelings, direct observation was unnecessary.

Implications for Practice

As discussed in Chapter One, one goal of this study is to provide the research site with information regarding how to improve their professional development. The recommendations determined from the study will hopefully help move the high school forward as a learning organization. In addition, the study determined recommendations that may be applicable to other rural high schools. The implications are succinctly displayed in Figure 3 followed by further explanations.

Figure 3
Implications for Practice

Discipline	Implications for Research Site	Implications for Minnesota Rural High Schools
Personal Mastery	• Incorporate personal professional growth goals into school-wide PD	• Bring teacher-valued aspects of externally-provided PD into district-provided PD
Mental Models	• Hold conversations about beliefs regarding teaching and learning to address mental models impacting what the school can accomplish • Look for commonalities among mental models to determine deeper mental constructs impacting attitudes and behaviors	• Use data to challenge established mental models of groups who are viewed from a deficit perspective • Scrutinize data for "self-fulfilling prophecies" that may be skewing results
Shared Vision	• Continuously revisit shared vision created from previous activity and use it as a driver for future PD	• Spend time in PD sessions developing shared vision through an iterative process • Provide teachers with decision-making opportunities regarding their PD
Team Learning	• Inspect current grouping procedures for ways to include single-member department teachers in productive teams • Adopt a PLC model sensitive to small or single-member departments	• Explore opportunities for single-member department teachers to form learning teams with content-alike teachers in nearby districts.
Systems Thinking	• Facilitate discussions between departments and grade levels during PD	• Encourage cross-curricular communication regarding assessment practices, vocabulary, projects, etc.
All Disciplines	• Hold conversations regarding PD needs with teachers who had a career prior to education	• Form partnerships with businesses to discuss how they address the five disciplines in PD • Consider implications for PD regarding Tier 1 and 2 teachers under Minnesota's new licensure

To improve the development of personal mastery, the research site can take steps to ensure that personal professional growth goals are incorporated into professional development. Currently, time is not provided during professional development to work on personal professional growth goals. Not only would this move help allocate needed time, but it would prevent these goals from being regarded as an administrative mandate. Additionally, the results showed that teachers at the research site reflected Wei et al.'s (2009) finding that high school teachers in general are more likely to attend out-of-district professional development. The PD the research site's teachers attended was specific to their content area which agrees with Lucilio's (2009) assertion that high school teachers are most enthusiastic about professional development related to their content. By drawing on that information, rural high schools could improve the perception of in-district PD by incorporating the strengths of the externally-provided PD that teachers find valuable.

Another implication for future practice is to institutionalize reflection for teachers on their mental models. As previously discussed, the low prevalence of the discipline of mental models was affecting the attitudes and actions of teachers and the professional development coordinators at the research site. In order to do this, the school must first promote reflective skills, then allocate time and develop structures for teachers to examine their mental models, and finally create a culture focused on inquiry and challenging teachers' thinking (Senge, 2006). Also, the mental models expressed by teachers at the research site commonly included a deficit perspective. Rural students were viewed as troublemakers and more experienced teachers were determined unlikely to participate in professional development. Nevertheless, the survey data indicated that the

teachers with the most experience actually felt there was a higher prevalence of the five disciplines compared with most subgroups. Therefore, referencing data can allow schools to challenge the mental models that exist among teachers and administrators. Senge et al. (2012) warn, however, that it is possible for data to represent self-fulfilling prophecies in which the information collected is already skewed by the actions of those operating under existing mental models. Rural schools can work to change mental models "by holding conversations with colleagues…where we openly examine our attitudes and the influences that put those views in our mind in the first place" (Senge et al., 2012, p. 400).

Shared vision was the lowest of the five disciplines according to the survey and resulted in a slight negative-leaning perception from teachers regarding its absence in professional development. Thus, it is a recommendation for the research site to revisit the outcomes of the process in which teachers engaged previously. The vision, which was created by teachers through a collaborative activity, can then be a driver for future PD. For rural schools that have not engaged in this process, Senge et al. (2012) suggest establishing a series of opportunities where teachers work together to generate a vision of their hopes for students.

It is a recommendation that the research site address the issue of team learning for teachers in departments of one. Team learning was a strength of professional development at the high school throughout the study, but is mostly missing from the professional development experiences of teachers in single-member departments. One suggestion is to consider PLC models that, unlike the current model for which the research site is providing substantial professional development, do not have a significant reliance on common assessments. Teachers also indicated that content-specific

professional development is most valuable to them, but single-member departments have few opportunities to experience this type of PD with the current team structures. One possibility is for these teachers to form teams with content-alike teachers in nearby districts. Today's technologies enhance the feasibility of these types of teams.

Although the teachers did not express frustration at the lack of systems thinking, Senge et al. (2012) argue, "In general, the goal of staff development should be to institutionalize a systems understanding of the school district" (p. 404). Senge (2006) explains that systems thinking is the fifth discipline because it is the cornerstone that brings all of the other disciplines together. Therefore, by developing a systems-thinking mindset in the high school, the other disciplines will come into focus as well. Thornton et al. (2007) say that all five disciplines must be fostered in order for the school to learn as a unit. The teachers at the research site indicated a lack of knowing what is happening in other departments. Therefore, the high school can make progress by facilitating interdepartmental discussions during professional development. Senge et al. (2012) contend that systems thinking is required when aligning curriculum in a school. By encouraging cross-curricular communication, teachers will be asked to employ a systems thinking mentality.

Finally, when reviewing the survey data, the subgroup of teachers who had a career prior to education was consistently low scoring. They were the lowest or second lowest subgroup in all five disciplines. Therefore, it may be informative to form partnerships with career fields outside of education to determine how they foster the five disciplines. If the teachers with prior careers felt like the disciplines were lacking, it may have been because they were stronger in their previous career fields. If this is not the

case, then it is possible that teachers with prior careers are not having their needs met through professional development causing the low scoring results. Nevertheless, it could be beneficial to the school organization to reach out to their teachers with prior careers to see what can be done to improve. Additionally, with the recent change to Minnesota's teacher licensure, individuals may become Tier 1 licensed teachers without educational training, as long as they have a bachelor's degree in another field, or they have work experience in a career and technical education field (Tier 1 License, 2018). Therefore, these teachers may have unique professional development needs due to their lack of education coursework. Rural schools, in particular, are more likely to hire Tier 1 teachers (Beesley, Atwill, Blair, & Barley, 2010; Gagnon & Mattingly, 2015). Thus, rural schools should consider how to equip Tier 1 teachers with necessary skills and leverage their skills from their previous experiences through professional development.

Recommendations for Further Research

While there are implications for practice at the research site, the study also revealed possible areas of further research. The recommendation is to replicate the study at another rural high school, or even the elementary or intermediate school in the same district. Though suggestions are provided that may be beneficial for other rural high schools, "No school's experience can be applied to another's situation wholesale. All schools, and their situations, are unique and require their own unique combination of theories, tools, and methods for learning" (Senge et al., 2012, p. 6). In addition, rural education studies should not be used to make inferences about other rural areas (Koziol et al., 2015; Miller, 2012). Thus, in order to further identify recommendations for

professional development in rural high schools, the study would need to be replicated to determine which conclusions are common among many rural high schools.

The next implication echoes the recommendation from Jeanpierre et al.'s (2005) study of science teacher professional development. Based on their results, they recommended further research on how careers prior to education affect teachers' perception and implementation of professional development. As explained in the recommendations for the research site, the survey respondents with prior careers averaged low-scoring responses for each of the five disciplines.

Another potential area of research would be studying how males and females experience professional development. For all five of the disciplines, female respondents averaged a lower prevalence than male respondents. It would be interesting to see if this was unique to the research site, or even to the specific respondents at the research site.

Finally, as the implications indicate, the most significant conclusion from the research is that different demographic subgroups experience the five disciplines uniquely. Little can be gleaned from the overall averages alone, which fall within a narrow range. Yet, the three lowest disciplines (shared vision, mental models, and personal mastery) all have a subgroup that averaged the discipline as "Usually not true through professional development", and another subgroup that averaged the discipline as "Usually true through professional development". The two highest disciplines (systems thinking and shared vision) are only slightly improved by having their lowest subgroup average between "Usually not true through professional development" and "Sometimes true and sometimes not true through professional development". Thus, in order to improve the professional development at the high school through the implementation of the five

disciplines, it is necessary to conduct further research to analyze the subgroups that are positively and negatively experiencing each discipline.

Chapter Summary

This chapter provides a conclusion to the research study. In the first section, the primary research question is answered by drawing conclusions from the data on the prevalence of the five disciplines of a learning organization. Though all five disciplines are discussed, it is determined that team learning was the most prevalent of the five disciplines in professional development at the high school. The next section of the chapter explains the results that answered the secondary research question, which related to whether or not teachers' perceptions of professional development were affected by the prevalence of the five disciplines. Team learning, the most prevalent discipline, also caused a positive perception of professional development at the research site. However, there was little evidence of a direct relationship between the prevalence and perception of the remaining disciplines. After answering the research questions, the data analysis is viewed through the lens of Guskey's (2000) five levels of evaluating professional development. For levels one and two (participants' reaction and participants' learning), the assessment indicated that professional development at the high school was average, with PLCs providing the most participant learning. Level three (organization support and change) had the highest assessment, which aligned to the high prevalence of team learning since level three includes collegial support. Levels four and five (participants' use of new knowledge and skills and student learning outcomes) did not have enough evidence to make an accurate determination of evaluation.

In the next section, limitations of the study that were present in the data collection and data analysis are described, followed by an explanation of the delimitations of the study and the rationale for them. The chapter concludes by identifying recommendations for future practice in professional development for the research site and potentially other rural high schools. Finally, the implications for further research are explained which highlight the importance of replicating the case study at other rural high schools to identify commonalities.

The purpose of this case study was to provide insight into the professional development at a rural high school using Senge's five disciplines of a learning organization as a framework. As the world becomes increasingly complex, "the only viable sustainable solution to the problems facing our nation's schools is to adopt a learning orientation" (Senge et al., 2012, p. 15). The rural context was selected to address the unique needs and characteristics of these schools that are often left out of educational research. This study adds to the existing body of research on professional development for teachers, which is extensive. However, both high school professional development and rural professional development are areas in which the research can expand. Through this study, the difficult task of providing meaningful, relevant, and effective professional development for all teachers in a school was highlighted. The research also illuminated the vast differences in how demographic subgroups of teachers experience the five disciplines. This has not been identified in literature on Senge's (2006) disciplines before.

The five disciplines meet many needs significant to a rural high school's professional development. Personal mastery addresses high school teachers' preference for content-specific professional development. Mental models about teaching and

learning are confronted in order to prevent counterproductive behavior. Building shared vision eliminates lack of buy-in from administrative decision-making. Fostering team learning requires examination of ways to support teams that include teachers from single-member departments, while also capitalizing on the benefits of a smaller sized staff. Systems thinking allows departments to work synergistically as opposed to independently to address student needs. Thus, this study elucidates that Senge's (2006) learning organization is a worthy framework around which rural schools can focus and develop their professional development. In order to keep highly-qualified teachers in rural schools, and provide an education for rural students that is equitable to non-rural students, professional development in rural schools must continue to be studied and improved.

REFERENCES

Anderson, M., & Lonsdale, M. (2014). Three Rs for rural research: Respect, responsibility and reciprocity. In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 193-204). New York, NY: Routledge.

Arnold, M. L., Newman, J. H., Gaddy, B. B., & Dean, C. B. (2005). A look at the condition of rural education research: Setting a difference for future research. *Journal of Research in Rural Education*, *20*(6), 1-25. Retrieved from http://jrre.psu.edu/articles/20-6.pdf

Azano, A. P., & Stewart, T. T. (2015). Exploring place and practicing justice: Preparing pre-service teachers for success in rural schools. *Journal of Research in Rural Education, 30*(9), 1-12. Retrieved from http://jrre.psu.edu/wp-content/uploads/2015/06/30-9.pdf

Baird, T. J., & Clark, L. E. (2018). The 'look-ahead' professional development model: A professional development model for implementing new curriculum with a focus on instructional strategies. *Professional Development in Education, 44*(3), 326-341.

Barrett, N., Cowen, J., Toma, E., & Troske, S. (2015). Working with what they have: Professional development as a reform strategy in rural schools. *Journal of Research in Rural Education*, *30*(10), 1-18.

Bartholomaeus, P., Halsey, J., & Corbett, M. (2014). A trialogue about method in rural education: Experiential perspectives. In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 58-71). New York, NY: Routledge.

Beck, F. D., & Shoffstall, G. W. (2005). How do rural schools fare under a high-stakes testing regime? *Journal of Research in Rural Education*, *20*(14), 1-12. Retrieved from http://jrre.psu.edu/articles/20-14.pdf

Beesley, A. D., Atwill, K., Blair, P., & Barley, Z. A. (2010). Strategies for recruitment and retention of secondary teachers in central U.S. rural schools. *Rural Educator, 31*(2), 1-9.

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Stanford, CA: The Carnegie Foundation for the Advancement of Teaching.

Chance, P. L., & Segura, S. N. (2009). A rural high school's collaborative approach to school improvement. *Journal of Research in Rural Education, 24*(5). Retrieved from http:// jrre.psu.edu/articles/24-5.pdf

Chigbu, U. E. (2013). Rurality as a choice: Towards ruralising rural areas in sub-Saharan African countries. *Development Southern Africa, 30*(6), 812-825.

Coladarci, T. (2007). Improving the yield of rural education research: An editor's swan song. *Journal of Research in Rural Education*, *22*(3), 1-9. Retrieved from http://jrre.psu.edu/articles/22-3.pdf

Committee of Graduate School of Education, University of Nebraska. (1919). *The rural teacher of Nebraska*. Washington D. C.: U.S. Bureau of Education.

Corbett, M., & White, S. (2014). Why put the 'rural' in research?. In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 1-4). New York, NY: Routledge.

Cubberley, E. P. (1914). *Rural life and education: A study of the rural-school problem as a phase of the rural-life problem.* Boston, MA: Houghton Mifflin.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York, NY: Teachers College Press.

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualization and measures. *Educational Researcher, 38*(3), 181-199.

Desimone, L. M. (2011). Research & development: A primer on effective professional development. *Phi Delta Kappan, 92*(6), 68-71.

Desimone, L. M., Porter, A. C., Garet, M., Yoon, K.S., & Birman, B. (2002). Effects of professional development on teachers' instruction: Results from a three-year study. *Educational Evaluation and Policy Analysis, 24*(2), 81-112.

Donehower, K. (2014). Metaphors we lose by: Re-thinking how we frame rural education. In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 166-180). New York, NY: Routledge.

DuFour, R., DuFour, R., Eaker, R., & Many, T. (2006). *Learning by doing: A handbook for professional learning communities at work*. Bloomington, IN: Solution Tree.

Dufour, R., & Reeves, D. (2016). The futility of PLC lite. *Phi Delta Kappan, 97*(6), 69-71.

Erdem, M., İlğan, A., & Uçar, H.İ. (2014). Relationship between learning organization and job satisfaction of primary school teachers. *International Online Journal of Education Sciences, 6*(1), 8-20.

Farhat, M., & Usman, K. (2016). Secondary school teachers' perceptions of their principals' leadership behaviors and their academic performance at secondary school level. *Bulletin of Education and Research, 38*(1), 41-55.

Fields, E., Levy, A., Tzur, K. Martinez-Gudapakkam, A., & Jablonski, E. (2012). The science of professional development. *Phi Delta Kappan, 93*(8), 44-46.

Fink, A. (1998). *How to conduct surveys: A step by step guide*. Thousand Oaks, CA: Sage Publications.

First Things First (2013, Nov. 5). Peter Senge address - 2013 First Things First annual summit [Video File]. Retrieved from https://www.youtube.com/watch?v=6L9KCzVhbsE

Fullan, M., Hill, P., & Crévola, C. (2006). *Breakthrough*. Thousand Oaks, CA: Corwin Press.

Gagnon, D. (2016). ESSA and rural teachers. *Phi Delta Kappan, 97*(8), 47-49.

Gagnon, D. J., & Mattingly, M. J. (2015). State policy responses to ensuring excellent educators in rural schools. *Journal of Research in Rural Education*, *30*(13), 1-14.

Garet, M., Porter, A., Desimone, L. Birman, B., & Yoon, K. (2001). What makes professional development effective? Analysis of a national sample of teachers. *American Education Research Journal*, *38*(4), 915-945.

Glover, T. A., Nugent, G. C., Chumney, F. L., Ihlo, T., Shapiro, E. S., Guard, K., … Bovaird, J. (2016). Investigating rural teachers' professional development, instructional knowledge, and classroom practice. *Journal of Research in Rural Education, 31*(3), 1-16.

Green, B., & Reid, J. (2014). Social cartography and rural education: Researching space(s) and place(s). In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 26-40). New York, NY: Routledge.

Guskey, T. R. (2000). *Evaluating professional development.* Thousand Oaks, CA: Corwin Press.

Guskey, T. R. (2002). Does it make a difference? Evaluating professional development. *Educational Leadership, 59*(6), 45-51.

Hatch, J. A. (2002). *Doing qualitative research in education settings*. Albany, NY: State University of New York.

Holmquest, J. [jfholmquest]. (2019, July 23). "Don't call yourself a PLC if you are not comparing common assessment data." - @mikemattos65 @SolutionTree #atPLC [Tweet]. Retrieved from https://twitter.com/jfholmquest/status/1153673528467709952

Howley, A., & Howley, C. B. (2005). High-quality teaching: Providing for rural teachers' professional development. *The Rural Educator, 26*(2), 1-5.

Howley, A., Wood, L., & Hough, B. (2011). Rural elementary school teachers' technology integration. *Journal of Research in Rural Education, 26*(9). Retrieved from http://jrre.psu.edu/ articles/26-9.pdf.

Howley, C. B., Theobald, P., & Howley, A. A. (2005). What rural education research is of most worth? A reply to Arnold, Newman, Gaddy, and Dean. *Journal of Research in Rural Education*, *20*(18), 1-6. Retrieved from http://www.jrre.psu.edu/articles/20-18.pdf

Johnson, J., Showalter, D., Klein, R., & Lester, C. (2014). *Why rural matters 2013–14: The condition of rural education in the 50 states*. Arlington, VA: Rural School and Community Trust. Retrieved from http://www.ruraledu.org/user_uploads/file/2013-14-Why-Rural-Matters.pdf

Jaquith, A., Mindich, D., Wei, R. C., & Darling-Hammond, L. (2010). *Teacher professional learning in the United States: Case studies of state policies and strategies*. Dallas, TX: National Staff Development Council. Retrieved from https://www.learningforward.org/docs/default-source/pdf/2010phase3technical report.pdf

Jeanpierre, B., Oberhauser, K., & Freeman, C. (2005). Characteristics of professional development that effect change in secondary science teachers' classroom practices. *Journal of Research in Science Teaching, 24*(6), 668-690.

Joyce, B. & Showers, B. (1983). *Power in staff development through research in training.* Alexandria, VA: ASCD.

Jump, L. (1994). Need to check title. In M. R. Webb (Ed.), *My folks and the one-room schoolhouse* (p. 6). Topeka, KS: Capper Press.

Kisa, Z., & Correnti, R. (2015). Examining implementation fidelity in America's Choice schools: A longitudinal analysis of changes in professional development associated with changes in teacher practice. E*ducational Evaluation and Policy Analysis, 37*(4), 437- 457.

Koziol, N. A., Arthur, A. M., Hawley, L. R., Bovaird, J. A., Bash, K. L., McCormick, C., & Welch, G. W. (2015). Identifying, analyzing, and communicating rural: A quantitative perspective. *Journal of Research in Rural Education*, *30*(4), 1-14. Retrieved from http://jrre.psu.edu/wp-content/uploads/2015/03/30-4.pdf

Kvale, S., & Brinkmann, S. (2008) *InterViews: An introduction to qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Lester, J. H. (2003). Planning effective secondary professional development programs. *American Secondary Education, 32*(1), 49-61.

Liamputtong, P. (2011). *Focus group methodology: Principles and practice*. Thousand Oaks, CA: Sage.

Lucilio, L. (2009). What secondary teachers need in professional development. *Catholic Education: A Journal of Inquiry and Practice, 13*(1), 53-75.

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Thousand Oaks, CA: Sage.

McMillan, J. H., & Schumacher, S. (2010). *Research in education: evidence-based inquiry.* (7th ed.). Boston, MA: Pearson.

Merchie, E., Tuytens, M., Devos, G., & Vanderlinde, R. (2018). Evaluating teachers' professional development initiatives: Towards an extended evaluative framework. *Research Papers in Education*, *33*(2), 143-168.

Miller, L. C. (2012). Situating the rural teacher labor market in the broader context: A descriptive analysis of the market dynamics in New York State. *Journal of Research in Rural Education*, *27*(13), 1-31. Retrieved from http://jrre.psu.edu/articles/27-13.pdf.

Minnesota Department of Education (2018). Minnesota report card. Retrieved from http://rc.education.state.mn.us

National Education Association of the United States (1898). Report of the Committee of Twelve on rural schools. In *Report of the Commissioner of Education for the year 1896-97* (Vol. 1, pp. 811-890). Washington: Government Printing Office.

Newcomb, A. (2003). Peter Senge on organizational learning. *School Administrator*, *60*(5), 20-25.

Nicolaidou, M., & Petridou, A. (2011). Evaluation of CPD programmes: Challenges and implications for leader and leadership development. *School Effectiveness and School Improvement, 22*(1), 51-85.

O'Neil, J. (1995). On schools as learning organizations: A conversation with Peter Senge. *Educational Leadership, 52*(7), 20-23.

Panagiotopoulos, G., Zogopoulos, C., & Karanikola, Z. (2018). The learning organization according to Senge: Recording and validation of the Park research tool in primary education schools in the prefecture of Ilia. *Global Journal of Human Resource Management, 6*(5), 1-19

Park, J. H. (2008). Validation of Senge's learning organization model with teachers of vocational high schools at the Seoul Megalopolis. *Asia Pacific Education Review, 9*(3), 270-284.

Reynolds, T., Murrill, L. D., & Whitt, G. L. (2006). Learning from organizations: Mobilizing and sustaining teacher change. *The Educational Forum, 60*(2), 122-133.

Richardson, J. (2011). The ultimate practitioner. *Phi Delta Kappan, 93*(1), 27-32.

Roberts, P. (2014). Researching from the standpoint of the rural. In M. Corbett & S. White (Eds.), *Doing educational research in rural settings* (pp. 135-147). New York, NY: Routledge.

Roscigno, V. J., & Crowley, M. L. (2001). Rurality, institutional disadvantage, and achievement/attainment. *Rural Sociology*, *66*(2), 268-293.

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: Sage.

Senge, P. (2006). *The fifth discipline: The art and practice of the learning organization.* New York, NY: Currency Press.

Senge, P., Cambron-McCabe, N., Lucas, T., Smith, B., Dutton, J., & Kleiner, A. (2012). Schools that learn: *A fifth discipline fieldbook for educators, parents, and everyone who cares about education.* New York, NY: Crown Business.

Smith, C. (2010). The great dilemma of improving teacher quality in adult learning and literacy. *Adult Basic Education and Literacy Journal, 4*(2), 67-74.

Sparks, D. (2001). Why change is so challenging for schools. *Journal of Staff Development*, *22*(3), 42–47.

Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development for teachers. *Journal of Staff Development, 10*(4), 40-57.

Staff Development Program, Minnesota Statutes, § 122A.60 (2015). Retrieved from https://www.revisor.mn.gov/statutes/?id=122a.60

Stewart, C. (2014). Transforming professional development to professional learning. *Journal of Adult Education, 43*(1), 28-33.

Stewart, C., & Matthews, J. (2015). The lone ranger in rural education: The small rural school principal and professional development. *The Rural Educator*, *36*(3), 49-60.

Thornton, B., Shepperson, T., & Canavero, S. (2007). A systems approach to school improvement: Program evaluation and organizational learning. *Education*, *128*(1), 48–55.

Tieken, M. C. (2014). *Why rural schools matter*. Chapel Hill: The University of North Carolina Press.

Tier 1 License, Minnesota Statutes, 122A.181 (2018). Retrieved from https://www.revisor.mn.gov/statutes/cite/122A.181

United States Census Bureau. (2015). *2010 Census urban and rural classification and urban area criteria*. Retrieved from https://www.census.gov/geo/reference/ua/urban-rural-2010.html

Universal Service Administrative Company. (2014). *Urban/rural lookup tool.* Retrieved from https://sltools.universalservice.org/portal-external/urbanRuralLookup/

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (n.d.). *School locale definitions*. Retrieved from http://nces.ed.gov/surveys/ruraled/definitions.asp

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2013). *The Status of Rural Education*. Retrieved from http://nces.ed.gov/programs/coe/indicator_tla.asp

Wallace, T. (2014). A comparison of professional development practices in rural and urban high schools. *The Rural Educator, 35*(2), 11-16.

Webster-Wright, A. (2009). Reframing professional development through understanding authentic professional learning. *Review of Educational Research, 79*(2), 702-739.

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad*. Dallas, TX: National Staff Development Council. Retrieved from http://learningforward.org/docs/pdf/nsdcstudytechnicalreport2009.pdf

Wei, R. C., Darling-Hammond, L., & Adamson, F. (2010). *Professional development in the United States: Trends and challenges*. Dallas, TX: National Staff Development Council. Retrieved from https://learningforward.org/docs/pdf/nsdcstudytechnicalreport2010.pdf

Wonnell, R. O. (1994). One-room schoolhouse of long ago. In M. R. Webb (Ed.), *My folks and the one-room schoolhouse* (pp. 1-3). Topeka, KS: Capper Press.

Yin, R. K. (2014). *Case study research: Design and methods (5th ed.).* Thousand Oaks, CA: Sage.

Yoon, K. S., Garet, M., Birman, B., & Jacobson, R. (2007). *Examining the effects of mathematics and science professional development on teachers ' instructional practice: Using professional development activity logs*. Washington, DC: Council of Chief State School Officers.

Appendix A: Principal Elite Interview Questions

1. What are some of the main themes or topics of your in-house professional development over the last 18 months?

2. What are the structures in place for your teachers' professional development?
    - When does it take place?
    - How often does it take place?
    - Large group or smaller group?
    - PLCs?
    - Instructional Coaching?

3. What is your role in planning in-house professional development for teachers?

The remaining questions will be asked in an order determined by the flow of the interview based on the interviewee's responses.

Questions about the Five Disciplines:

Personal Mastery

- In what ways are teachers able to identify and work on personal professional goals?

- Roughly what percentage of your teachers are truly dedicated to their own learning and growth as educators? What evidence do you have of that?

Mental Models

- What are some assumptions or stereotypes you feel your teachers may have regarding students and learning?

Shared Vision

- Do you feel your teachers have a shared vision for your school? If so, what is that shared vision?

- In what ways do teachers contribute to the creation of the shared vision?

- How is the shared vision communicated through professional development activities?

Team Learning

- How do teachers work in small groups or teams for professional development purposes?

- Overall, how strong do you feel your teachers are at working together as a team and learning together as a team? What evidence do you have?

Systems Thinking

- To what extent do teachers consider their colleagues, the school, etc. when making decisions about student learning?

- How do your professional development activities help teachers see the big picture of the school as a whole, as opposed to focusing on their one classroom or department?

Questions Evaluating Professional Development:

Organization Support & Change

- Organization Policies
- Resources
- Protection from Intrusions
    - How do you protect the time set aside for professional development from interruptions (other teaching duties, school requirements, etc.)?

- Openness to Experimentation and Alleviation of Fear
    - To what extent are teachers encouraged to try new practices or strategies?

    - What is the expectation if teachers try something new?

- Collegial Support
    - Do teachers show up on time for professional development?

    - To what extent do teachers show enthusiasm for new ideas or trying new strategies?

    - Do teachers have the opportunity to observe each other?
    - Are there any teachers who belittle others trying to improve or trying new strategies?

- Leadership and Support

    - How do you continue to develop professionally? Do you think your teachers are aware of these efforts?

- How do you collaborate with teachers to improve instructional practices in the school?

- In your opinion, would teachers say you value their perspectives?

- Have you changed your practices at all as a result of any professional development efforts in the last 18 months?

- Higher-Level Administrators' Leadership and Support
  - To what extent is the superintendent or other district administrators involved in professional development at the high school? Have opportunities ever been provided to share with colleagues from other districts?

- Recognition of Success
  - How do you recognize teacher success?

  - Do you see teachers taking pride in their students' successes? Provide examples.

  - Is data examined to note successes and identify areas of improvement?

- Provision of Time
  - Do teachers have sufficient time to implement new strategies learned about through professional development?

  - Do you feel teachers have enough time to meet collaboratively with colleagues?

Participant Learning & Use of Knowledge/Skills

- Can you think of any evidence you have that teachers have learned from their professional development in the last 18 months?

- Can you think of any evidence you have that teachers have applied their knowledge from professional development into their practice?

Appendix B: Professional Development Coordinator Elite Interview Questions

1. What are some of the main themes or topics of your in-house professional development over the last 18 months?

2. What are the structures in place for your teachers' professional development?
    - When does it take place?
    - How often does it take place?
    - Large group or smaller group?
    - PLCs?
    - Instructional Coaching?

3. What is your role in planning in-house professional development for teachers?

The remaining questions will be asked in an order determined by the flow of the interview based on the interviewee's responses.

Questions about the Five Disciplines:

Personal Mastery

- In what ways are teachers able to identify and work on personal professional goals?

- Roughly what percentage of your teachers are truly dedicated to their own learning and growth as educators? What evidence do you have of that?

Mental Models

- What are some assumptions or stereotypes you feel your teachers may have regarding students and learning?

Shared Vision

- Do you feel your teachers have a shared vision for your school? If so, what is that shared vision?

- In what ways do teachers contribute to the creation of the shared vision?

1. How is the shared vision communicated through professional development activities?

Team Learning

- How do teachers work in small groups or teams for professional development purposes?

- Overall, how strong do you feel your teachers are at working together as a team and learning together as a team? What evidence do you have?

Systems Thinking

- To what extent do teachers consider their colleagues, the school, etc. when making decisions about student learning?

- How do your professional development activities help teachers see the big picture of the school as a whole, as opposed to focusing on their one classroom or department?

Questions Evaluating Professional Development:

Organization Support & Change

- Organization Policies
- Resources
- Protection from Intrusions
    - How do you protect the time set aside for professional development from interruptions (other teaching duties, school requirements, etc.)?

- Openness to Experimentation and Alleviation of Fear
    - To what extent are teachers encouraged to try new practices or strategies?

    - What is the expectation if teachers try something new?

- Collegial Support
    - Do teachers show up on time for professional development?

    - To what extent do teachers show enthusiasm for new ideas or trying new strategies?

    - Do teachers have the opportunity to observe each other?
    - Are there any teachers who belittle others trying to improve or trying new strategies?

- Leadership and Support

    - How do you continue to develop professionally? Do you think your teachers are aware of these efforts?

- Recognition of Success
    - How do you recognize teacher success?
    - Do you see teachers taking pride in their students' successes? Provide examples.
    - Is data examined to note successes and identify areas of improvement?

- Provision of Time
    - Do teachers have sufficient time to implement new strategies learned about through professional development?
    - Do you feel teachers have enough time to meet collaboratively with colleagues?

Participant Learning & Use of Knowledge/Skills

- Can you think of any evidence you have that teachers have learned from their professional development in the last 18 months?
- Can you think of any evidence you have that teachers have applied their knowledge from professional development into their practice?

Appendix C: Focus Group Guide

First Question: When you hear "Professional Development at [the research site]," what activities, events, programs, processes do you think of?

Second Question: Which professional development activities do you find most valuable? What about them makes them valuable?

The following questions will be asked in an order determined by the flow of the focus group based on the group's responses.

Personal Mastery

- Do you feel like you are provided with professional development time to work on your personal professional goals?

- In your opinion, are your teacher colleagues committed to their own continuous learning?

Mental Models

- What are some assumptions or stereotypes, good or bad, you feel teachers may have regarding students and learning (could be related to which students learn, how students learn, etc)?

- Through your professional development, do you take part in activities that help you address these assumptions?

Shared Vision

- Is there are shared vision for the school regarding student learning?

- What role have you had in developing that shared vision?

- How has the shared vision been addressed through professional development activities?

Team Learning

- What learning teams do teachers have at the school (small groups that you spend time learning with)?

- What are some of the strengths and weaknesses of learning in small groups at this school?

Systems Thinking

- When teachers want to make a change in student learning, perhaps in their own classroom or department, do they think about how it will affect their colleagues? Can you provide examples?

- How do your professional development activities help you see the forest through the trees (see the whole school system instead of your specific classroom or department)?

What have you learned from professional development that you have implemented in your classes?

Last Question: Overall, how do you feel about the quality of professional development for teachers at your school?

Appendix D: Teacher Survey

Senge's Five Disciplines in Professional Development at a Rural High School

When responding to this survey, please consider any professional development you encounter through the school or district, not necessarily limited to events specifically planned by the staff development committee (e.g. professional growth plans, peer coaching, mentoring).

Please respond to the following statements by indicating the level of truth. For each statement, consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

How many years of experience do you have as a licensed professional in education?

a. 1-3
b. 4-10
c. 11-20
d. 21-30
e. 31 or more

Have you worked in education at a district other than [the research site] in the past 10 years?

a. Yes
b. No

Did you have a career prior to working in education?

a. Yes
b. No

How many people work in your department?

a. 1
b. 2-3
c. 4-5
d. 6-7
e. more than 7

What is your sex?

a. Female
b. Male
c. Prefer Not to Say

How far is your commute to [the research site]?

a. 0-10 miles
b. 11-20 miles
c. 21-30 miles
d. 31-45 miles
e. More than 45 miles

Personal Mastery

At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.

Please respond to the following statements pertaining to personal mastery. Consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

1 = Almost Never True Through Professional Development;
2 = Usually Not True Through Professional Development
3 = Sometimes True or Sometimes Not True Through Professional Development;
4 = Usually True Through Professional Development;
5 = Almost Always True Through Professional Development

Teachers engage in continuous learning and reflection activities as to achieve personal growth.	1	2	3	4	5
Teachers continually work to clarify professional goals at the school.	1	2	3	4	5
Teachers view the current reality more clearly in terms of career goals.	1	2	3	4	5
Teachers have learning opportunities in teaching or other professional work.	1	2	3	4	5
At the school, teachers continually learn to bridge the gap between current reality and the desired future.	1	2	3	4	5

Teachers strive to supplement the lack of skills and knowledge in teaching and subject area.	1	2	3	4	5

Mental Models

At the school, teachers continually reflect on assumptions about schooling; openly dialogue, share views and develop knowledge about each other's assumptions; and engage in their own work with flexibility.

Please respond to the following statements pertaining to mental models. Consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

1 = Almost Never True Through Professional Development;
2 = Usually Not True Through Professional Development
3 = Sometimes True or Sometimes Not True Through Professional Development;
4 = Usually True Through Professional Development;
5 = Almost Always True Through Professional Development

Teachers often reflect on assumptions about schooling activities with other teachers to ensure that they are in line with educational principles.	1	2	3	4	5
Teachers inquire about the appropriateness of their own course or program with respect to the goals of schooling.	1	2	3	4	5
Teachers learn and change as a result of students' reactions during teaching.	1	2	3	4	5
Teachers often use the significant events of the school or classroom to think about their own beliefs about education.	1	2	3	4	5
Teachers change their old teaching style or pattern to implement new and better approaches in educational practices.	1	2	3	4	5
Teachers actively explore assumptions and ideas with each other about educational practices.	1	2	3	4	5

Teachers are highly aware of how their own beliefs and assumptions affect educational practices.	1	2	3	4	5
Teachers at the school can effectively explain their own assumptions underlying their reasoning.	1	2	3	4	5

Shared Vison

Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.

Please respond to the following statements pertaining to shared vision. Consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

1 = Almost Never True Through Professional Development;
2 = Usually Not True Through Professional Development
3 = Sometimes True or Sometimes Not True Through Professional Development;
4 = Usually True Through Professional Development;
5 = Almost Always True Through Professional Development

Teachers and staff together build the school's vision and goals.	1	2	3	4	5
Teachers develop their personal goals to align with the whole school vision or goals	1	2	3	4	5
Teachers align personal class or teaching goals with the school vision and goals.	1	2	3	4	5
Teachers feel comfortable in sharing ideas with other teachers about the school vision.	1	2	3	4	5
Teachers are committed to a shared vision for the future of school.	1	2	3	4	5
Teachers agree on the principles necessary to achieve the school vision.	1	2	3	4	5

When changing educational practices, teachers consider the impact on the school vision and goals.	1	2	3	4	5

Team Learning

Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.

Please respond to the following statements pertaining to team learning. Consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

1 = Almost Never True Through Professional Development;
2 = Usually Not True Through Professional Development
3 = Sometimes True or Sometimes Not True Through Professional Development;
4 = Usually True Through Professional Development;
5 = Almost Always True Through Professional Development

Teachers feel free to ask questions of other teachers or staff regardless of gender, age, and professional status at the school.	1	2	3	4	5
At the school, group or team works are used in teacher professional development.	1	2	3	4	5
Teachers are treated equally in team or committee activities.	1	2	3	4	5
Teachers share information across course subjects and grade levels with other colleagues.	1	2	3	4	5
Teachers believe that sharing information or knowledge through team activities is useful for solving complex school problems.	1	2	3	4	5
Teachers respect other colleague's ideas and opinions by viewing them from their colleague's perspective.	1	2	3	4	5

Teachers participate in open and honest conversations to share their best educational practices.	1	2	3	4	5

Systems Thinking

Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.

Please respond to the following statements pertaining to systems thinking. Consider any school or district-provided professional development that occurred at [the research site] in the last twelve months.

1 = Almost Never True Through Professional Development;
2 = Usually Not True Through Professional Development
3 = Sometimes True or Sometimes Not True Through Professional Development;
4 = Usually True Through Professional Development;
5 = Almost Always True Through Professional Development

When developing lesson plans, teachers consider the different needs and abilities of students.	1	2	3	4	5
When changing educational practices, teachers consider the impact on their results to the inside and outside of the school.	1	2	3	4	5
When dealing with a student discipline problem, teachers consider the impact on other teachers.	1	2	3	4	5
Teachers regard educational issues as a continual process rather than with a snapshot or event.	1	2	3	4	5
Teachers attentively link the current schooling with students' career pathways	1	2	3	4	5
When changing and creating school rules, teachers consider consistency with the policy of the governments and educational acts.	1	2	3	4	5

When dealing with school challenges, teachers consider the effect on students.	1	2	3	4	5

Appendix E: Institutional Review Board's Approval Letter

Institutional Review Board
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IRB Chair: Lisa Ferguson-Stegall, PhD
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Feb. 11, 2019

To: Jaquelyn Stevens, Student Researcher

CC: Charlayne Myers, Faculty Advisor

Protocol title: Mixed Method Case Study on the Prevalence of Senge's Five Disciplines of a Learning Organization in a Rural High School's Professional Development

In accordance with Federal Regulations for review of research protocols, the Hamline University Institutional Review Board has reviewed the above referenced protocol and made the following determination.

Your protocol has been approved on February 11, 2019.

This approval is under Expedited Category 1, for *Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.*

The IRB approval number that should be noted in your written project and in any major documents alluding to the research project is:

2019-01-9ET

Please use the **attached approved informed consent document**, which references the approval number and date on the document.

Your IRB approval expires one year from the date above. The IRB would like to stress that subjects who go through the informed consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

As the principal investigator of this project, you are required to:

(1) Inform the IRB of any proposed changes in your research that will affect human subjects. This is done by submitting an Amendment form, which is found on the IRB website, to the IRB Chair at IRB@hamline.edu. Changes may not be initiated until written IRB approval is received.

(2) Report any unanticipated problems and adverse events to the IRB as soon as they occur.

(3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.

(4) Insure that only persons formally approved by the IRB enroll subjects.

(5) Use only a currently approved consent form (remember approval periods are for 12 months or less).

(6) Protect the confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information. This includes requiring that all individuals who recruit subjects, obtain informed consent, and/ or participate in data collection or analysis complete the Hamline IRB Training Module.

(7) Submit a Closure Report form to notify the IRB when the study has been completed.

(8) Note that Continuing Review is not required for protocols approved under the expedited review procedure.

(9) Please help us help you by including the above protocol number on all future correspondence relating to this protocol.

(10) Notify us of any changes in your contact information.

I wish you success with your project. If you have any questions, you may contact me at IRB@hamline.edu.

Sincerely,

Lisa Ferguson-Stegall, PhD
Hamline University IRB Chair

Appendix F: Approved Elite Interview Consent Form

Hamline University
Institutional Review Board has approved this consent form.
IRB approval # 2019-01-9ET
Approved: 2-11-19
Expires one year from above approval date.

HAMLINE UNIVERSITY

Informed Consent to Participate in Research

Hamline University

You are being asked to participate in a research study that is a required component of the student researcher's doctoral dissertation. This form provides you with information about the study. The student researcher, Jackie Stevens, under the supervision of her faculty advisor, Dr. Charlayne Myers, will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions.

This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.

- If you have any questions about or do not understand something in this form, you should ask the student researcher, Jackie Stevens, for more information.
- You should feel free to discuss your potential participation with anyone you choose, such as family or friends, before you decide to participate.
- Do not agree to participate in this study unless the student researcher has answered your questions and you decide that you want to be part of this study.

Your participation is entirely voluntary, and you can refuse to participate or withdraw at any time.

The research study in which you are asked to participate is titled the following: The prevalence of Senge's five disciplines of a learning organization in a rural high school's professional development.

The student researcher, Jackie Stevens, can be reached via email at jstevens06@hamline.edu. Her faculty advisor, Hamline professor Dr. Charlayne Myers, can be reached at cmyers01@hamline.edu.

Consent to complete the research from the high school was obtained from the high school principal and staff development committee on September 27th, 2018.

The study will examine three foundations: Peter Senge's five disciplines of a learning organization, rural schools, and professional development. The purpose of the study is to discover the prevalence of Senge's five disciplines in professional development of a rural high school, and to determine how that prevalence impacts teachers' perceptions of the professional development. The study is not funded by any organization, and any costs will be borne by the student researcher. Below are the definitions of Senge's Five Disciplines adapted for schools:

Discipline	Definition
Personal Mastery	At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.

Mental Models	At the school, teachers continually reflect on assumptions about schooling; openly dialogue, share views and develop knowledge about each other's assumptions; and engage in their own work with flexibility.
Shared Vision	Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.
Team Learning	At the school, various group or team activities are encouraged to address schooling issues or teacher's professional work; teachers become committed to, skilled at, and involved in collaborative work.
Systems Thinking	Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.

Park, J. H. (2008). Validation of Senge's learning organization model with teachers of vocational high schools at the Seoul Megalopolis. *Asia Pacific Education Review, 9*(3), 270-284.

To participate in this research study, you are asked to participate in a one-on-one interview with student researcher, Jackie Stevens. The interview is expected to last between 30 to 60 minutes. The interview will be audio recorded. You are being asked to participate in the interview as someone who is partially responsible for planning professional development at the research site. There is no cost to you for participating in this study. There is also no compensation for participating in the interview.

By participating in this study, there is a small chance of loss of confidentiality. This risk is minimal and steps will be taken to protect your confidentiality as explained later in this form. No other risks have been identified as a result of participating in this study. Please contact the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu to discuss this if you wish.

Please be aware that if you experience any emotional distress as a result of your participation in this study, you should contact the following counseling services:



There are some possible benefits to you and others as a result of your participation in the study. First of all, the overall conclusions drawn from the data collection will be shared with you, as someone who plans and implements professional development in your school. You may use these conclusions to continue high-quality professional development or improve the professional development at your school. In addition, the personal reflections you experience as a result of thinking about and responding to the interview questions may be useful to you in your practice. Finally, the completed dissertation will add to the existing body of research regarding professional development in rural schools, thus furthering research and improvement in this area.

Your participation in this study is entirely voluntary. You are free to refuse to participate in the study, and your refusal will not influence your current or future relationships with Hamline University or your employer.

You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop your participation in this research study for any reason, you should contact the the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu. You should also call or email the Dr. Charlayne Myers with any questions, concerns, suggestions, or complaints about the research and your experience as a participant in the study. In addition, if you have questions about your rights as a research participant, please contact Dr. Lisa Stegall, Chair of the Institutional Review Board at Hamline University at IRB@hamline.edu.

Your name will not be included in the dissertation, and your name will not be asked during the recorded interview, so it will not be present in the transcript to protect your confidentiality. The audio recording will be transcribed and the digital recording will be deleted. The printed transcript will be kept in a locked filing cabinet for three years after the completion of the study and then destroyed.

The researchers, Jackie Stevens and her advisor Dr. Charlayne Myers, will gain no benefit from your participation in this study beyond the presentation of the results obtained from the study, and the invaluable research experience and hands-on learning that the will be gained as a part of the educational experience which is a component of the student researcher's doctoral dissertation.

The research study is public scholarship and the abstract and final product will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository. If you would like to be informed of the results of the research, you may contact Jackie Stevens at jstevens06@hamline.edu.

Appendix G: Approved Focus Group Consent Form

Hamline University
Institutional Review Board has approved this consent form.
IRB approval # 2019-01-9ET
Approved: 2-11-19
Expires one year from above approval date.

HAMLINE UNIVERSITY

Informed Consent to Participate in Research

Hamline University

You are being asked to participate in a research study that is a required component of the student researcher's doctoral dissertation. This form provides you with information about the study. The student researcher, Jackie Stevens, under the supervision of her faculty advisor, Dr. Charlayne Myers, will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions.

This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.

- If you have any questions about or do not understand something in this form, you should ask the student researcher, Jackie Stevens, for more information.
- You should feel free to discuss your potential participation with anyone you choose, such as family or friends, before you decide to participate.
- Do not agree to participate in this study unless the student researcher has answered your questions and you decide that you want to be part of this study.

Your participation is entirely voluntary, and you can refuse to participate or withdraw at any time.

The research study in which you are asked to participate is titled the following: The prevalence of Senge's five disciplines of a learning organization in a rural high school's professional development.

The student researcher, Jackie Stevens, can be reached via email at jstevens06@hamline.edu. Her faculty advisor, Hamline professor Dr. Charlayne Myers, can be reached at cmyers01@hamline.edu.

Consent to complete the research from the high school was obtained from the high school principal and staff development committee on September 27th, 2018.

The study will examine three foundations: Peter Senge's five disciplines of a learning organization, rural schools, and professional development. The purpose of the study is to discover the prevalence of Senge's five disciplines in professional development of a rural high school, and to determine how that prevalence impacts teachers' perceptions of the professional development. The study is not funded by any organization, and any costs will be borne by the student researcher. Below are the definitions of Senge's Five Disciplines adapted for schools:

Discipline	Definition
Personal Mastery	At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.

Mental Models	At the school, teachers continually reflect on assumptions about schooling; openly dialogue, share views and develop knowledge about each other's assumptions; and engage in their own work with flexibility.
Shared Vision	Vision and goals of school are planned and created through a process of shared commitment, participatory activities, and consensus of all school members including students and parents; and a teacher's personal vision is aligned with the school vision and goals.
Team Learning	At the school, various group or team activities are encouraged to address schooling issues or teacher's professional work; teachers become committed to, skilled at, and involved in collaborative work.
Systems Thinking	Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.

Park, J. H. (2008). Validation of Senge's learning organization model with teachers of vocational high schools at the Seoul Megalopolis. *Asia Pacific Education Review, 9*(3), 270-284.

To participate in this research study, you are asked to participate in a focus group facilitated by student researcher, Jackie Stevens. The focus group is expected to last approximately 60 minutes. It will be audio recorded. You, along with 5-9 of your colleague, are being asked to participate in the focus group as someone who participates in professional development at the research site. You will be asked about your opinions on your school's professional development and any changes you have made in your practice as a result. There is no cost to you for participating in this study. There is also no compensation for participating in the focus group.

By participating in this study, there is a small chance of loss of confidentiality. This risk is minimal and steps will be taken to protect your confidentiality as explained later in this form. No other risks have been identified as a result of participating in this study. Please contact the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu to discuss this if you wish.

Please be aware that if you experience any emotional distress as a result of your participation in this study, you should contact the following counseling services:

There are some possible benefits to you and others as a result of your participation in the study. First of all, the overall conclusions drawn from the data collection will be shared with those who plan and implement professional development in your school. They may use these conclusions to continue high-quality professional development or improve the professional development at your school. In addition, the personal reflections you experience as a result of thinking about and responding to the focus group questions may be useful to you in your practice. Finally, the completed dissertation will add to the existing body of research regarding professional development in rural schools, thus furthering research and improvement in this area.

Your participation in this study is entirely voluntary. You are free to refuse to participate in the study, and your refusal will not influence your current or future relationships with Hamline University or your employer.

You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop your participation in this research study for any reason, you should contact the the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu. You should also call or email the Dr. Charlayne Myers with any questions, concerns, suggestions, or complaints about the research and your experience as a participant in the study. In addition, if you have questions about your rights as a research participant, please contact Dr. Lisa Stegall, Chair of the Institutional Review Board at Hamline University at IRB@hamline.edu.

Your name will not be included in the dissertation, and your name will not be asked during the recorded focus group, so it will not be present in the transcript to protect your confidentiality. The audio recording will be transcribed and the digital recording will be deleted. The printed transcript will be kept in a locked filing cabinet for three years after the completion of the study and then destroyed.

The researchers, Jackie Stevens and her advisor Dr. Charlayne Myers, will gain no benefit from your participation in this study beyond the presentation of the results obtained from the study, and the invaluable research experience and hands-on learning that the will be gained as a part of the educational experience which is a component of the student researcher's doctoral dissertation.

The research study is public scholarship and the abstract and final product will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository. If you would like to be informed of the results of the research, you may contact Jackie Stevens at jstevens06@hamline.edu.

Appendix H: Approved Survey Consent Form

Hamline University
Institutional Review Board has approved this consent form.
IRB approval # 2019-01-9ET
Approved: 2-11-19
Expires one year from above approval date.

HAMLINE UNIVERSITY

Informed Consent to Participate in Research

Hamline University

You are being asked to participate in a research study that is a required component of the student researcher's doctoral dissertation. This form provides you with information about the study. The student researcher, Jackie Stevens, under the supervision of her faculty advisor, Dr. Charlayne Myers, will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions.

This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.

- If you have any questions about or do not understand something in this form, you should ask the student researcher, Jackie Stevens, for more information.
- You should feel free to discuss your potential participation with anyone you choose, such as family or friends, before you decide to participate.
- Do not agree to participate in this study unless the student researcher has answered your questions and you decide that you want to be part of this study.

Your participation is entirely voluntary, and you can refuse to participate or withdraw at any time.

The research study in which you are asked to participate is titled the following: The prevalence of Senge's five disciplines of a learning organization in a rural high school's professional development.

The student researcher, Jackie Stevens, can be reached via email at jstevens06@hamline.edu. Her faculty advisor, Hamline professor Dr. Charlayne Myers, can be reached at cmyers01@hamline.edu.

Consent to complete the research from the high school was obtained from the high school principal and staff development committee on September 27th, 2018.

The study will examine three foundations: Peter Senge's five disciplines of a learning organization, rural schools, and professional development. The purpose of the study is to discover the prevalence of Senge's five disciplines in professional development of a rural high school, and to determine how that prevalence impacts teachers' perceptions of the professional development. The study is not funded by any organization, and any costs will be borne by the student researcher. Below are the definitions of Senge's Five Disciplines adapted for schools:

Discipline	Definition
Personal Mastery	At the school, teachers expand personal growth and capacity by having a strong desire to improve professionally, engaging in continual learning, and focusing on the future vision in order to make choices about their development.

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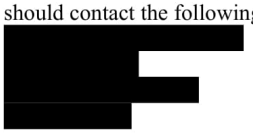
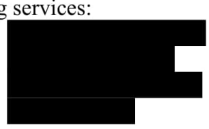
Team Learning	At the school, various group or team activities are encouraged to address schooling issues or teacher's professional work; teachers become committed to, skilled at, and involved in collaborative work.
Systems Thinking	Teachers understand and manage their own work in an interrelationship within the school environment that includes processes of change; they consider the impact of their own work on the entire school organization and the stakeholders' interests.

Park, J. H. (2008). Validation of Senge's learning organization model with teachers of vocational high schools at the Seoul Megalopolis. *Asia Pacific Education Review, 9*(3), 270-284.

To participate in this research study, you are asked to complete an anonymous online survey consisting of 35 multiple choice questions. The survey is expected to take approximately 10 minutes to complete. Participants will have two weeks from the initial dispersal of the survey to complete it. All certified staff at the research site who participate in professional development are eligible to complete the survey. The survey has been sent to all certified staff at this research site with the hope that all will participate by completing the survey. There is no cost to you for participating in this study. There is also no compensation for completing the survey.

By participating in this study, there is a small chance of loss of confidentiality. This risk is minimal and steps will be taken to protect your confidentiality as explained later in this form. No other risks have been identified as a result of participating in this study. Please contact the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu to discuss this if you wish.

Please be aware that if you experience any emotional distress as a result of your participation in this study, you should contact the following counseling services:


There are some possible benefits to you and others as a result of your participation in the study. First of all, the overall conclusions drawn from the data collection will be shared with those who plan and implement professional development in your school. They may use these conclusions to continue high-quality professional development or improve the professional development at your school. In addition, the personal reflections you experience as a result of thinking about and responding to the survey questions may be useful to you in your practice. Finally, the completed dissertation will add to the existing body of research regarding professional development in rural schools, thus furthering research and improvement in this area.

Your participation in this study is entirely voluntary. You are free to refuse to participate in the study, and your refusal will not influence your current or future relationships with Hamline University or your employer.

You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop your participation in this research study for any reason, you should contact the the student researcher, Jackie Stevens, at jstevens06@hamline.edu or 320-260-2382, or her faculty advisor, Dr. Charlayne Myers, at cmyers01@hamline.edu. You should also call or email the Dr. Charlayne Myers with any questions, concerns, suggestions, or complaints about the research and your experience as a participant in the study. In addition, if you have questions about your rights as a research participant, please contact Dr. Lisa Stegall, Chair of the Institutional Review Board at Hamline University at IRB@hamline.edu.

The online survey will not collect email addresses or names to protect your confidentiality. The online results of the survey will be printed shortly after the survey closing date which is two weeks after the initial dispersal of the survey. The online results will be deleted. The printed results will be kept in a locked filing cabinet for three years after the completion of the study and then destroyed.

The researchers, Jackie Stevens and her advisor Dr. Charlayne Myers, will gain no benefit from your participation in this study beyond the presentation of the results obtained from the study, and the invaluable research experience and hands-on learning that the will be gained as a part of the educational experience which is a component of the student researcher's doctoral dissertation.

The research study is public scholarship and the abstract and final product will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository. If you would like to be informed of the results of the research, you may contact Jackie Stevens at jstevens06@hamline.edu.

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits, and risks that are involved in this research study:

_____ _____

Signature and printed name of person obtaining consent Date

_____

Title of person obtaining consent

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.