

THE INTERSECTION OF SCIENCE TEACHER RETENTION, ATTRITION, AND  
MIGRATION WITH ACCOUNTABILITY REFORM IN RURAL GEORGIA

by

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(Under the Direction of J. Steve Oliver and Deborah Tippins)

ABSTRACT

The school districts of the United States of America seek to provide all students with a high quality, state-funded education that will prepare them to succeed in life beyond their school years. Of utmost importance to scholars, educators, policymakers, and the general public is the goal that each student receives an equitable education, regardless of his/her race, religion, gender, socioeconomic status, or geographical location. As a component of the *No Child Left Behind Act* (2002), the educational system has placed much greater emphasis on testing and accountability measures to indicate whether or not students, teachers, school districts, and states are achieving their goals of educational excellence. Scholars, policymakers, and parents assert that the individual teachers play pivotal roles in the learning experiences of students. Thus, the ability to staff schools with highly qualified teachers is of utmost importance. Research suggests that the fields of science, technology, engineering, and mathematics (STEM), face a more difficult task than other educational disciplines in recruiting and retaining teachers. Within rural areas, this teacher retention problem is magnified for all subject disciplines, exacerbating the problem of retaining STEM teachers.

The purpose of the study presented here was to examine the robustness of the science teaching profession during this time of top-down accountability through an exploration of the retention, attrition, and migration of science teachers in one subset of Georgia schools. Data analysis focused on the individual tensions that science teachers faced when deciding whether or not to remain in teaching.

Using purposive sampling, the science teachers from four contiguous counties were asked to participate in this study of career trajectory. The schools were chosen, because of their rural geographic location as well as the demographic characteristics of the students within the school. Research suggests that rural and urban schools characterized by a majority of African American students are the most difficult schools to adequately staff.

Using in-depth qualitative methods, the findings from the research study suggest that neither geographic location nor student demographics fully explained the career trajectory decisions made by the highly qualified teachers studied. Rather, teachers grappled with multiple tensions that influenced their career trajectory. The tensions centered on the following four dimensions of the science teaching profession: (a) the differences between novice and experienced teachers' interpretations of context-related tensions, (b) the impact of accountability measures within the schools, (c) the power of teacher unity on student success, and (d) the ways that cultural myths impacted the schools studied.

INDEX KEY WORDS: SCIENCE EDUCATION, RURAL, ACCOUNTABILITY, DEPROFESSIONALIZATION, CULTURAL MYTHS, TEACHER RETENTION

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## Chapter 1

### Introduction

As Paul Shaker (2004) contends, “Public education tends to be the repository for the best hopes and worst fears of every generation and thus has always been contested and deeply influenced by political and cultural struggles” (p.1445). In the 21<sup>st</sup> Century, the United States of America continues to strive towards providing a high quality, state-funded education to all citizens. Until recently, the United States has chosen to localize control of the schools, following the federalized state system. With the landmark passing of the federal inducement *No Child Left Behind 2002* (NCLB), the public school systems are experiencing unparalleled federal involvement with the way in which teachers and schools are held accountable for their daily interactions with students. NCLB and accompanying legislation monitor the products of schools, in the form of students’ standardized scores, endeavoring to encourage better teaching and learning experiences for all students (NCLB, 2002). The lofty endeavor of providing a high quality, state-funded education for all citizens requires multiple tangible and intangible components, including having enough competent, intelligent people that choose teaching as their career.

Amid this new context, characterized by top-down standards and accountability, there is an outcry for increased numbers of highly qualified teachers, especially in science, technology, and mathematics fields (STEM). Historically, schools and administrators have struggled to staff STEM positions, yet the tenor has changed, as programs such as President Obama’s *Educate to Innovate* (2009) illustrates. *Educate to Innovate* simultaneously highlighted the supply and demand issues associated with STEM educators and the impact of the actual teachers on students’ learning.

President Obama stated:

The quality of math and science teachers is the most important single factor influencing whether students will succeed or fail in science, technology, engineering and math. Passionate educators with content expertise can make all the difference, enabling hands-on learning that truly engages students—including girls and underrepresented minorities—and preparing them to tackle the grand challenges of the 21st century such as increasing energy independence, improving people’s health, protecting the environment, and strengthening national security. (January, 2010,¶3)

Government officials, educational researchers, parents and children alike voice concerns over the quality of schooling, often citing teachers as the most influential factor regarding an individual’s experience with school. When either teacher quality or teacher demand is examined in relation to demographic trends, including race, socioeconomic status, and school location, staffing issues follow distinct patterns in what educational researchers call “hard-to-staff” schools. Hard-to-staff schools are often characterized by student populations with large proportions of children of color from homes with a low socioeconomic status, and are often located in urban or rural areas. The research has heretofore not made clear an answer to the following question: Why do the administrators at these schools continue to struggle to adequately staff teaching positions?

### **Statement of the Problem**

The National Commission on Teaching America’s Future (2008) asserted, “Teacher retention has become a national crisis” due to excessive teacher turnover (p.21). While often studied (Boe, Cook, & Sunderland, 2008; Horng, 2009), researchers continually find the issue of turnover difficult to explain. Quantitative data (Horng, 2009; Ingersoll, 2001) has indicated that

teacher turnover in science classrooms continues to rise, especially in rural and urban contexts (Ingersoll, 2006). In science education specifically, multiple reports, including the *Glenn Commission on Mathematics and Science Teaching for the 21st Century* have enumerated the demographic distribution of the teacher shortages specifically in mathematics and science education. As scientists, policymakers, and educators have developed plans to turn out more teachers, Ingersoll (2001) suggested a different approach, i.e., a focus on retention. Ingersoll described research that focused only on recruiting as shortsighted, equating this strategy to trying to fill a bucket with a large hole in the bottom. Ingersoll explained that focusing solely on teacher recruitment without analyzing *why* teachers left, would not improve the schools due to continued attrition of teachers. Specifically, the National Academy of Science (2006) published a study entitled *Rising Above the Gathering Storm*, which suggested an impending shortage of STEM teachers in excess of 10,000 within the decade. To “fill the bucket,” this report suggested recruiting 10,000 collegiate graduates with bachelors degrees in a science field to complete certification and teach for five years. Similarly, Teach for America aspires to “fill the bucket” by recruiting content specialists to teach for two years, before beginning another career. Specifically, Teach for America’s mission statement (2010) stated:

We recruit outstanding recent college graduates from all backgrounds and career interests to commit to teach for two years in urban and rural public schools. We provide the training and ongoing support necessary to ensure their success as teachers in low-income communities. (March 2010, ¶3)

While plans such as Teach for America address the content expertise needed to teach, the plans fail to recognize that content expertise alone does not adequately prepare a person to teach.

In direct opposition to philosophical underpinnings from the group Teach for America or documents such as *The Gathering Storm*, a vast body of literature asserts that science teaching is a complex profession that requires skills that are honed over time and require a particular set of skills that improve with experience (Tobias, 2009). Ingersoll (2001) suggested that instead of simply creating more teachers, we should explore why teachers leave. Characterized as the “profession that eats its young” (Osborne, 1991), political leaders decry teacher quality issues while teacher advocates question why we cannot keep quality educators in the classroom and improve learning.

### **Purpose and Rationale**

Multiple researchers (Borman & Dowling, 2008; Guarino et. al, 2006; Horng, 2009; Ingersoll, 2001, 2003, 2006; Johnson, 2004), using a variety of methodologies drawn from varied epistemological stances, have explored teacher turnover in recent years. For example, Ingersoll (2001, 2003, 2006) has utilized economic labor theory to quantitatively assess career trajectory patterns for teachers, including an analysis of the revolving door phenomena for science teachers on a national scale. Others (Johnson, 2004) have implemented qualitative methodologies to enrich their understanding of a particular group of teachers in relation to their career trajectory decisions. Collectively, scholarly research has constructed a set of characteristics from which a model can be shown of the most or least likely individuals to leave the profession. In relation to individuals that leave, researchers (Ingersoll, 2001; Tobias, 2009) have suggested that up to 30% do so for reasons other than retirement or family changes; instead, these teachers cited dissatisfaction with their profession as the reason they left.

Within this study, the researcher aimed to specifically unpack the root causes of teacher dissatisfaction and its resultant teacher turnover. Specifically, dissatisfaction related to the

tensions that arise from personal, professional, and contextual components of teaching were explored. Utilizing qualitative methodologies to examine how teachers mitigated career trajectory decisions, this study was designed to address the problem of science teacher retention, attrition, and migration within the rural, Black Belt region of Georgia.

### **Purpose of Timeline for Research**

The researcher strategically began data collection in February of 2009 due to the rehiring process that schools systems utilize. Generally, school systems offer teachers an agreement that contracts them to teach another year within that school system. If teachers break a contract, they risk revocation of their teaching license. Therefore, signing a contract is a good indicator of a teacher's intent for the next year. Instead of asking teachers *after* they have made their career decisions, the researcher began data collection *before* contracts were offered to the participants and continued into the following school year. Multiple researchers (Arnold, 2005; Brownwell, Bishop, & Sindelar, 2005; Ingersoll, 2007) have explored teacher turnover remotely *after* teachers have made their career decision. Other researchers (Hornig, 2009) have asked teachers hypothetical questions regarding factors impacting teacher retention. This study aimed to illuminate the personal, individual experience of each participant before, during, and after they made his/her career trajectory choice for the 2009-2010 school year.

### **Purpose of Context**

Within United States schools, one third of all students attend a rural school. There is consensus (Arnold, 2005; Budge, 2006) that rural schools present a unique context for schooling in comparison to urban and suburban schools. Rural schools operate under the same laws, with comparable expectations and goals as their urban and suburban counterparts, yet the overall

context significantly varies, in relation to reform implementation and other aspects of the role teachers play. Over the last thirty years, few scholars (Howley, 2005; Theobald, 1996) have focused on the rural context, due to less funding availability, which has led to a dearth of research that specifically focuses on these areas (Arnold, 2005; Ingersoll, 2007). To further complicate the issues surrounding development of an understanding of science teacher retention, excluding the *Rural Systemic Initiatives in Science, Mathematics, and Technology Education Program*, which examined the ‘third wave’ of systemic reform in action in rural settings, there is very little research on science teacher retention in rural areas (Arnold, 2005; Brownwell et. al, 2005; Ingersoll, 2007).

Within the rural context, this study was situated in the particular region of Georgia, which sociologists call the Black Belt Region. This area, also known as the “cotton counties” and the “plantation counties,” is considered by many to have a distinct milieu, denoting it as a sociological region, even though it stretches through multiple states (Webster & Bowman, 2008). Situating this study within the Black Belt region of Georgia enabled the researcher to study teacher retention in rural schools predominately attended by African American students. For each school in this study, the African American population surpassed 65% of the total student enrollment. Morris (2009) has asserted that the majority of researchers understand African American schooling in the rural South in an historical manner. Researchers have tended to focus on the forced relocation and enslavement of Africans and the subsequent disenfranchisement of African American people instead of African American schooling *now* in the South. When researchers have studied predominately African American schools, the inquiry has focused on urban centers, or the “new south” which has overlooked rural African American teachers, schools, and students (Morris, 2009).

For this study, the researcher studied schools in four contiguous counties: Five Points, Lorraine, Gray, and Wilson Counties (all names are pseudonyms). Each of the counties was characterized by a declining population, as manufacturers continued to close mills that once supported the small towns, resulting in the relocation of traditional businesses to other locations (Boatright & Batcher, 2006; U.S.Census, 2007). Each of these schools had, at some point in recent years, experienced rates of teacher turnover higher than the national average, often surpassing 50%. Although, multiple scholars have utilized large data sets (Ingersoll, 2009; Scafidi, Sjoquist, & Stinebrickner, 2007) to explore teacher retention, there is a dearth of in-depth qualitative analysis of teacher retention within this rural context.

### **Overview of Methodological Framework**

The following research questions guided this inquiry:

1. *What tensions do science teachers experience regarding career persistence in rural schools?*
  - a. *How are these tensions associated with personal dimensions of rural science teaching?*
  - b. *How are these tensions associated with professional dimensions of rural science teaching?*
  - c. *How are these tensions associated with contextual dimensions of rural science teaching?*
2. *Within the context of this study, what implicit or explicit cultural myths impact science teacher retention?*

The researcher implemented a qualitative, interpretive design aimed at understanding the individual teacher's thought process regarding decision-making. Specifically, the researcher adapted Frederick Erickson's (1986) research design methods to generate assertions to explain how teachers viewed their jobs. This provided an in-depth, bottom-up look at the teaching profession. The researcher asked participants to tell their stories, including the ways in which they negotiated issues concerning career trajectories, during the research process. The participants also interacted in focus groups and semi-structured interviews to deepen and broaden the researcher's understanding, thus providing triangulating evidence to support the researcher's assertions.

### **Overview of Theoretical Framework**

The theory base that provided structure for this research included constructionism (Crotty, 2003) and the teaching as a way of being perspective (Feldman, 1997). Denzin and Lincoln (2003) explained that a "researchers' epistemological, ontological and methodological premise" are framed in a given paradigm (p. 33). Specifically, the researcher "approaches the world with a set of ideas, a framework of theories that specifies a set of questions that he or she then examines in specific ways (p.30). Two interrelated domains of inquiry guided this research: constructionism and teaching as a way of being.

### **Constructionism**

Epistemology is a construct that encompasses the nature of knowledge, including the possibility and scope of how people *know what they know* (Crotty, 2003). Constructionist epistemology asserts that human beings construct meaning as they interpret life experiences within the world. Philosophers Heidegger (1977) and Merleau-Ponty (1962) argued that

meaning resides in individuals' interactions with the world. Constructionist epistemology concurrently rejects objectivism and subjectivism, evoking an image of humans living their daily lives, interacting with the world and one another, to construct meaning. Through this personal experience, "meaning is born" (Crotty, 2003).

### **Teaching as way of being**

Building on constructionist epistemology, Feldman's teaching as a way of being conceptualized teaching as a highly contextualized, socially situated endeavor exemplified through a teacher's actions with particular students within a given context (Feldman, 1997). Teaching as a way of being utilized concepts from three previously constructed theoretical frameworks—teacher knowledge (Shulman, 1986), teacher reasoning (Schön, 1987), and a sociocultural perspective (Clandinin & Connelly, 1994)—to construct the teaching as a way of being perspective. Feldman (1997) added a fourth dimension that he called *teachers as individuals* to complete this framework.

The teacher knowledge perspective described teachers as individuals possessing various bodies of knowledge specific to the teaching field. Schulman's (1986) seminal work on pedagogical content knowledge has influenced multiple studies (Grimmett & MacKinnon, 1992; Grossman, 2004) over the past decades, which focused on specific knowledge that deepens and expands in conjunction with the growth of the teachers' expertise. The teacher reasoning perspective, greatly influenced by Schön's (1987) work on reflective practitioners, encouraged people to think of teachers as thoughtful, reflective people who aim to improve their practice. This perspective suggested that educators act responsibly in decision-making regarding their students. Teachers explore problems that have multiple solutions and utilize their vast knowledge and reasoning skills to make the best decision for their students at a given time. Collectively, the

teacher knowledge and teacher reasoning perspectives constructed a vision of teachers as highly skilled, capable individuals. Feldman (1997) asserted that teachers need exceptional content and pedagogical knowledge that they utilize daily. Teachers analyze their decision-making and alter their actions based on reflection. However, these perspectives failed to acknowledge that teachers are people constantly interpreting their environment in order to make meaning during each situation. Meaning, Feldman explained, is connected to the actions, beliefs, and intentions of teachers, not just their knowledge base (Feldman, 1997). Moreover, these two earlier perspectives failed to acknowledge the influence of context on the teaching process. This acknowledgement is what a sociocultural perspective provides.

The sociocultural perspective envisioned teachers as individuals who acted on and within a given context (Feldman, 2002). Multiple researchers (Roth, Lawless, & Tobin, 2000; Tobin & McRobbie, 1996) have constructed interactional models that focused on the personal beliefs, goals, and actions of teachers. Feldman explained how a model of social construction of these beliefs might be created and further he described how the components of this model were explanatory with regard to teachers beliefs. These beliefs resulted in teachers altering their conceptualization of teaching in a way that prioritized their constructed understandings. For example, Clandinin and Connelly's (1994) sociocultural perspective described the teacher as a curriculum negotiator. According to these scholars, this negotiation included components such as knowledge and people (community members, administration, students and parents), as well as cultural, political, and economic aspects of the teaching context. Feldman took attributes from the sociocultural perspective as well, yet he differed on his interpretation of the relationship between context and teacher. Teaching as a way of being asserted that teachers and their actions might only be understood within a given context.

Rooted in existentialism, teaching as a way of being delineated the teacher as a *teacher*, not a person *doing* the action of *teaching*. People, Feldman (2000) explained, “exist first as who they are, as a product of history, biography, relations with others, and intentions” (p. 1038). The *way of being* perspective acknowledged that individuals exist in situations, which extend beyond context to encompass personal experiences as well as intention for the future (Feldman, 2002). These situations include influences from multiple lived experiences, including “traditions, institutions, customs, and the purposes and beliefs they carry and inspire” (Dewey, 1938, p. 43). The situational aspect of this theoretical perspective prioritized the impact of human interaction on the person and situation, which acknowledged that for teachers, the act of teaching is personal. For teachers, their work is more than a job.

Feldman explained that in order to understand the way a person *is* a teacher, researchers must unpack the contextual understandings that educators have constructed of their school and students. Feldman asserted that new understandings must illuminate the humanness of the teachers, so that the intentions and actions of the educators can be understood (Feldman, 2002). As evidenced by the research methodology implemented in the study, the researcher prioritized a plan that would create a deep understanding of the teacher’s actions within their particular school. Synergistic application of constructionism and the four facets of “teaching as a way of being” undergirded this study of teacher retention.

### **Definition of Salient Terms**

1. Tension(s) - refers to the emotional push and pull that individuals experience when making a decision. Tension(s) felt by an individual will likely increase as the issues involved in the decision-making become increasingly complex.
2. Personal dimension(s) of teaching: refers to the cognitive aspects of teaching constructed primarily by the individual and that impact a given teacher as an individual. These may include relationships outside of the school, such as family or friends, decisions about where to live, hobbies, as well as the individual feelings of the teacher.
3. Professional dimension(s) of teaching: refers to cognitive aspects of teaching constructed primarily by the teaching profession, including standards and accountability and educational reform, and the impact a teacher as a member of a professional community.
4. Contextual dimension(s) of teaching: refers to the cognitive aspects of teaching experience that are constructed primarily within an individual school or community. This dimension is constructed through the emotional intersection of the individual who is attempting to perform a teaching job with other members/stakeholders of the community or school.
5. Rural: refers to those places and schools situated in a location distinctly different from metropolitan/suburban and are characterized in this study by geographically isolated areas, declining populations, and an overall low socio economic status of its residents.

6. Highly qualified teacher: an individual having a degree (or equivalent) in the subject matter field as well as appropriate state certification. This definition of highly qualified is utilized by the state of Georgia. Middle school educators may receive a certificate that permits them to teach science without taking many science courses. The definition of what constitutes a highly qualified teacher is complicated. For example, in one case a participant in the study took only two science courses in college, yet the state considers him highly qualified in his field, as a consequence of his middle grades certification. Likewise, another scenario is the rural teacher, certified in biology, yet asked to teach a physical science or chemistry course. This individual is highly qualified according to the criteria specified by the state of Georgia. Throughout the study, issues related to the meaning of highly qualified emerged, due to the oversimplified delineation of the term.
7. Novice teacher- an individual new to the teaching field.

### **Summary and Preview**

This chapter is first and foremost an illustration of the need for the research study, which prioritized the development of a nuanced understanding of science teacher retention, attrition, and migration in The Black Belt region of Georgia. The stated purpose of the study was to investigate science teacher retention through an interpretive perspective to add to the current body of research. An abbreviated outline of the methods used to conduct the research was presented. In addition, the theoretical frameworks grounding the research were summarized. In the following chapter, the salient literature regarding teacher retention and the related reform documents will be examined.

## Chapter 2

### Review of Salient Literature

The need to staff schools with qualified teachers has received vast attention from policymakers, researchers, and the public. In science education specifically, multiple reports, including the *Glenn Commission on Mathematics and Science Teaching for the 21st century* (2006), reports from the National Research Council, and the National Academy of Sciences (2006) have enumerated the specifics of teacher shortages in science related fields. Although valuable, these reports and studies have sought to understand issues of affecting teacher shortages in a decontextualized manner, privileging breadth of study instead of depth. This study aimed to deeply delve into the context in which individual teachers work, exposing multiple, sometimes overlapping tensions that impacted the choices they make concerning their individual career trajectory. The researcher chose to privilege both context and teacher voice due to her fundamental belief that context and science teacher retention is inextricably linked. The primary purpose of this literature review was to situate the issue of science teacher retention and attrition, as well as the partnering waves of educational reform, within the political, social, and economic climate of the United States. In particular, this literature review, delimited by the controversial document *A Nation at Risk (NAR)*, focused on the issue of science teacher retention and attrition throughout the last twenty-five years, generally considered WAVE II of reform in science education (Kahle, 2007). The review presented here begins with an examination of the political, economic, and social aspects of society that contributed to the writing of *A Nation at Risk* and continues through Wave III of reform, which

included a call to raise standards, a call to restructure schools, and a call to provide comprehensive services for all students. This decision to limit the review to the years between 1980 and 2010 was chosen due to two reasons. First, the researcher believes that NAR document laid the groundwork for federal intervention in day-to-day classroom activities in United States classrooms in a manner unprecedented, impacting the teaching profession immensely. Second, this document altered the research agenda in education as well as the political landscape that now focuses on improving teacher quality through multiple methods, including design of preparation programs and professional development experiences, standardized assessment of students, and implementation of controls on who enters the profession. The review explores the phenomena of teacher retention, attrition, and mobility within each wave of educational reform, situating the results within the social, economic, and political contexts. This created a rich picture of the context that surrounded the educational research during each phase of educational reform. To conduct this review, electronic database searches of the *Education Abstracts* and *Social Science Abstracts*, ERIC, JSTOR, Education, Wiley-Scientific, Google Scholar, table-of-contents searches of education journals as well as review of education handbooks were conducted. Resources from the National Center for Education Statistics were reviewed as well. Key words for searches included: teacher retention, science teacher retention, teacher mobility, teacher turnover, teacher attrition, rural, rural education, and policy. Collectively, this review examined the issues of teacher retention, recruitment, and attrition throughout the last two waves of science education reform in the United States, framing each reform and the accompanying research on science teacher retention, attrition, and migration within the accompanying political and educational climate.

## **WAVE II: Improving Scientific Literacy in the Age of Technology**

*A Nation at Risk* (1983) signaled the onset of Wave II of educational reform in the United States, which focused on the courses taken by students, and their perceived competencies, which standardized tests measured (Kahle, 2007). A brief rendering of the social, political and economic landscape during this time explains *why* this document was constructed. During the early 1980s, the Cold War continued with the Union of Soviet Socialist Republics (USSR) while a new war, an economic war, began with Japan. The decade began with inflation rates in double digits, which placed a huge financial burden on the middle class. Concurrently, Japan's economy continued to grow, competing with America in multiple markets. Finally, the Cold War continued, coloring the political and economic climate. Collectively, these tensions provided the foundation for another sweeping reform of the public school system. Economically and politically, individuals in the United States public and private sector believed they had lost power, prestige, and academic superiority that needed to be regained. The nation turned to the public schools to do this.

Politically, in 1980, the Reagan Administration campaigned on the promise to eliminate the U.S. Department of Education while the Democratic majority promised to save the department. Amidst this political issue, on August 26<sup>th</sup>, 1981 Terrell Bell, Reagan's first secretary of education, created the National Commission on Excellence in Education (NCEE), who he tasked with discerning the quality of education in the United States at the secondary and collegiate level (Bell, 1993).

These explicit goals of the Commission included:

- Reviewing and synthesizing scholarly literature on teacher quality and student learning in the U.S
- Examining and comparing the curricula, standards and expectations of the U.S. with other countries
- Studying the college admission standards of different schools and their impact on high school curricula,
- Reviewing educational programs where students from those schools consistently attain high scores on college entrance exams and continue to excel in the university setting, and
- Reviewing the major changes to the American educational system as well as societal changes over the last 25 years

The findings from the National Commission on Excellence in Education (1983) began with the following:

Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur--others are

matching and surpassing our educational attainments. If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievement made in the wake of the Sputnik challenge. Moreover, we have dismantled essential support systems which helped make those gains possible. We have, in effect, been committing an act of unthinking, unilateral educational disarmament. Our society and its educational institutions seem to have lost sight of the basic purposes of schooling, and of the high expectations and disciplined effort needed to attain them. This report, the result of 18 months of study, seeks to generate reform of our educational system in fundamental ways and to renew the Nation's commitment to schools and colleges of high quality throughout the length and breadth of our land. (p.5)

The recommendations from the commission's came from an 18-month study. The report was divided into four main categories: content, standards and expectations, time in school, and teaching and leadership/fiscal support.

- In terms of content, the commissioners used the traditional scope, sequence, continuity and balance referents as a framework for examining the high school curriculum from 1964-1969 and compared it to the course pattern found from 1976-1981, constructing a call for the "New Basics." Major findings included an increase in students taking a general program of study from 12% in 1964 to 42% in 1979. The commissioners concluded that the secondary curriculum had become "homogenized, diluted, and diffused to the point that they no longer have a central purpose (p.19)." In response, the commission advised that all students seeking a diploma take "Five new basics" which included four years of English, three years of

mathematics, three years of social studies and three years of science. The commission also strongly advised college bound students to take two years of a foreign language. The actual impact of the report on states' curricula remains difficult to examine, since each state had its own curricula.

- In terms of standards and expectations, the commissioners called on universities to increase their entrance requirements, using standardized tests of achievement to make the decision. These tests, the commission recommended, should also be put in place in the lower grades. The commission addressed textbooks in particular, calling for scientists to partner with master teachers to determine which books to adopt in each state.
- In terms of time, the commission advocated for increasing the amount of homework each student completes, increasing the number of days and minutes students are at school and eliminating the burdensome paperwork placed on teachers. Finally, the report called for ability grouping.
- In terms of teachers and leaders, the commission began by conveying the important role that principals and superintendents play in implementing reform of any nature.

The NCCE named the final report *A Nation at Risk* (NAR). NAR's main thesis explained the downward spiral of student performance as an indicator that the United States educational system was broken, which left the nation's technical, military, and economic facets exposed. The report, which gathered data from high schools, compared American schools with those found in Germany and Japan and made a strong case for drastic reform in order to maintain a democracy in the modern world. This report found 13% of the nation's 17-year-olds and 40% of minority youth were illiterate. Moreover, according to Pulliam (2007), the average SAT score dropped over 50 points between 1963 and 1980. Although multiple researchers (Berliner & Biddle, 1995)

critiqued the statistical analysis within *NAR* and others (Goodlad, 2003) argued that linkages between student achievement and the national economy were exaggerated within the document, the inflammatory wording unhinged the United States public, which set the stage for implementation of a new wave of reform based on standards and accountability (Koppich, 2004). In 1983, Terrence Bell admitted that he knew that publication of this report would "...make it difficult politically to eliminate or significantly diminish the federal role" in education (p. 593), which was his goal with this report.

### **Education Research of the 1980s**

This portion of the review begins with an overarching synopsis of the teacher education research findings that pertain to teacher retention during the 1980s. Afterward, the findings are organized according to methodologies used in the various studies. During the 1980s, due to technological innovations in the computer industry, researchers placed tremendous focus on implementing new statistical methodologies, which impacted the findings. This final section summarized the vast findings from the 1980s.

#### **Using Simple Attrition Rates**

Amid the aforementioned political context, in which the public and government purported a need for better teaching, two demographic trends, increasing student enrollment as well as an aging teaching force, led researchers to conceptualize teacher retention in terms of supply and demand (Darling-Hammond, 1984; Grissmer & Kirby, 1987). Multiple researchers (Chapman, 1984; Grissmer & Kirby, 1987; Heyns, 1988) utilized economic labor theory to inform their research while policymakers aspired to increase teacher quality. Multiple researchers (Darling-Hammond, 1984; Grissmer & Kirby, 1987; Murnane, 1989; National

Academy of Science, 1987; Platt & Olson, 1990) suggested that the projected shortfalls in available, qualified teachers would force the nation's schools to lower their standards to fill vacancies. This literature base aimed to identify who taught, why they left and whether or not the teachers were highly qualified to do their job. Research focused on teachers' careers patterns consisted of two main kinds in the early 1980s: estimation of attrition rates from one year to the next in a given area and longitudinal studies of different teachers' careers trajectories who began teaching at the same time. This section focuses on the pivotal studies found using attrition rates from one year to the next. Researchers explored the phenomena using general survey data of teachers that remained and those that left the profession. Although scholars varied sample size and context, the methodologies remained similar.

The methodology implemented by multiple researchers (Allred & Smith, 1984; Arnold, Choy, & Bobbitt, 1993; Grissmer & Kirby, 1987, 1992) involved use of descriptive analysis to determine who remained in teaching, and studies suggested that science and math teachers tended to exit the teaching profession at higher rates than other teachers (Arnold, Choy, & Bobbit, 1993; Grissmer & Kirby, 1992). Examining the labor market of teaching and conceptualizing retention and attrition in terms of supply and demand, Grissmer and Kirby (1987) provided estimates of attrition rates by teachers' age and subject matter using data from Illinois, Michigan, New York and Utah extracted from state reports covering the time period from 1979-1982. Their findings suggested that employment patterns approximated a U-shaped curve, characterized by high attrition rates early in teachers' careers, followed by a slowing in attrition, then another increase as teachers retired, which suggested that retirement reduced the pool of available teachers. Multiple researchers (Mayfield, 1982; Oliver, 1980) implemented similar methodologies which focused on simple attrition rates from one year to the next.

Grissmer et. al (1984) reported that approximately 6% of teachers employed one year were gone the next year. The National Center for Education Statistics (2010) continues to use this 6% annual attrition to predict present day supply and demand issues. Collectively, this research aimed to illuminate why teachers chose to stay or leave the teaching profession, positioning teachers as logical decision makers.

### **Implementing Survival Methods**

Other researchers implemented a bivariate approach which questioned relationships found between retention and attrition rates and another variable, such as education level, school location, or subject taught (Shen, 1997). Researchers (Mark & Anderson, 1978, 1985; Schlechty & Vance, 1981; Theobald, 1990) conceptualized the issue of teacher retention in terms of survival, noting that 94% of teachers persisted from year to year. Heyns (1988) analyzed data from the *National Longitudinal Study (NLS)*, finding that between 60%-70% of the teachers sampled were still teaching five years later. Others (Chapman & Hutcheson, 1982; Frank & Keith, 1984) found that this survival rate held over multiple contexts. Some researchers (Lauritzen & Friedman, 1991; Theobald, 1990) focused on one district, computing survival rates for the whole system while others restricted their participants by only using novice teachers (Mark & Anderson, 1985; Murnane, 1987).

### **Longitudinal Research of Teacher Retention and Attrition Rates**

Many researchers began implementing two-wave comparison studies, which aimed to offer insight into how, why and when teachers leave their profession, gleaning more than just a snapshot view of teaching (Haggstrom, Darling-Hammond, & Grissmer, 1988). These methods aimed to provide a more nuanced perspective of teacher career trajectory by tracking factors

associated with why teachers changed career paths by using the increased statistical power that new computers allowed. This multiwave paradigm incorporated survival analysis (Willett & Singer, 1991). Survival analysis provided summary information pertaining to the times during which attrition most often occur. All survivor functions are characterized by a negatively accelerating extinction curve. Implementation of longitudinal studies included studies at the national level (E.g. Heyns, 1988), state longitudinal studies (Murnane et al., 1989; Schlechty & Vance, 1981), cross-sectional state samples (Billingsley & Cross, 1991) as well as single state studies (Chapman, 1984). Longitudinal studies documented patterns such as differing survival rates for women and men (Charters, 1970; Mark & Anderson, 1978, 1985). Mark and Anderson's trend-setting study followed over 15,000 St. Louis teachers for 13 years where they documented the largest proportion of newly hired teachers to leave the profession in less than five years. This study examined a cohort of St. Louis teachers that entered the profession in 1975, and found higher survival rates for female than males, a reversal from the pre-1975 cohorts. Authors discussed factors which included teacher effectiveness, salaries, and future demand for new teachers over an extended time frame. Grissmer et. al (1988) implemented methods to collect data at two different points as well by building on their earlier (1987) work on teacher retention. Kirby and Grissmer (1993) utilized the human capital theory to explore the phenomena, positing that individuals systemically assess the costs and benefits of entering the teaching profession. There authors indicated that the relative ease with which teachers enter the field impacted career persistence, a finding earlier stated by Lortie (1975). Kirby and Grissmer explained the remainder of the U-shaped curve by positing that as teachers accumulated human capital within their field they were more likely to stay. Chapman and Green (1986) studied four groups of University of Michigan graduate students with teaching certificates. The groups

included those that continued to teach, those that never taught, those that left teaching and those that taught intermittently. Chapman et. al (1986) found that personal characteristics, educational experience, professional integration into teaching, and career satisfaction impacted teachers' decision-making. These researchers used social learning theory to explain their findings.

Theobald (1990) explored teacher retention through the theory of economically rational decision makers. Collectively, these researchers implemented longitudinal data collection and coupled the findings with social theories, including human capital theory and rational decision-making to explore and explain teacher retention issues.

Other researchers implemented a bivariate approach, which explored the relationship between retention and attrition and one other variable. For example, Murnane et al (1991) utilized data from the NCES during the time period from 1960-1990 and explored the impact of salary, gender, demographic characteristics, and subject taught on teacher retention and attrition. Murnane's study utilized data from North Carolina and Michigan to construct comparisons of who remained in the teaching field, who left, and their reasons for each choice. They found higher teacher attrition rates during the early years of a teaching career and that younger women left the profession more often than older women. Within specific subject disciplines, elementary teachers persisted longest while physics and chemistry teachers had the shortest careers. Finally, teachers in urban districts, regardless of race, left faster than suburban teachers and Black teachers persisted longer than white teachers across all schools. Murnane utilized the data from these two states and, due to the similarity in results, presented findings as generalizable. Murnane et al. (1991) also confirmed earlier studies (Schlechty & Vance, 1981) that "bright" teachers were more likely to leave the profession than other teachers, based on the scores

teachers received on standardized testing. The following section explores Murnane's work in more detail.

Murnane et. al (1988) utilized a multivariate framework of proportional hazards modeling and focused on whether career persistence varied systematically by specific teacher characteristics. Murnane et. al followed 6,000 beginning teachers' careers for 12 years and focused on length of initial employment as well as whether or not teachers returned after leaving. Due to statistical complications, only white teachers were studied. Findings of significance included a large percentage of teachers who returned to teaching after an interruption; specifically, over 30% returned. This landmark study also explored teacher attrition rates in different subjects for the first time. In science specifically, chemistry and physics teachers were found to have the shortest teaching careers while biology teachers stayed the longest. Collectively, science teachers were found to be the least likely to return to teaching after an interruption. Murnane et al.'s (1988) analysis explained "teachers leave teaching not only because they are "pushed" by frustration. They are also "pulled" to alternative opportunities, including fulltime childrearing and more lucrative employment" (p. 23).

Murnane continued his teacher inquiry (1989) focusing on differences in teaching opportunities between African American teachers and White teachers, specifically conceptualizing the research in terms of factors that inhibited teachers from entering the field. Using the North Carolina Department of Public Instruction data base, Murnane et. al focused analyses on 47,403 beginning teachers. These researchers used a maximum likelihood logistic regression analyses to explore the relationship between entry into teaching and personal characteristics, which allowed them to form and test hypotheses as well as predict future rates for people entering teaching. Murnane et. al findings indicated that state competency exams had

become a barrier for African Americans, who took and passed the newly implemented gateway test in lower numbers than Caucasian graduates. These standardized tests, such as the Texas Examination of Current Administrators and Teachers (TECAT) gained popularity during the late 1980s and early 1990s. During this time period, 42 states implemented standardized testing of some sort to measure teacher ‘competence’ which showed an increase from three states six years earlier (Ferguson et.al, 2000). Collectively, Murnane’s work in the 1980s illuminated two main areas of concern in teacher attrition: testing as a gatekeeper for African American teachers as well as large discrepancies in attrition rates based on subject taught, each of which directly impacted science instruction.

### **Synthesis of Findings from the 1980s Research**

Bonnie Billingsley (1993) reviewed the empirical educational research of the 1980s on teacher attrition in regular education as well as special education. She constructed a conceptual model of the influences of teachers’ career decisions based on the educational research she reviewed. Her model proposed that career decisions were influenced by “external,” “employment,” and “personal” factors. The external factors included societal, economic, and institutional variables that neither the teacher nor the school district could control. The review suggested that employment factors, such as work conditions and professional qualifications potentially increased retention rates. Finally, personal variables, such as demographics and family decisions interacted with employment factors, leading to the career decision of teachers. Billingsley noted a lack of depth in the research, explaining that “the relationship between these factors and teachers and career decisions involve complex, involving many interactions (p. 147). However, specific methodologies capable of examining teacher retention were not suggested.

In 1988, the RAND Corporation , supported by the U.S. Department of Education,

constructed and implemented a study aimed at assessing teacher supply and demand (Haggstrom, et. al, 1988). This study laid the groundwork for the development of the protocols for the School Staffing Survey administered by the Center for Education Statistics (CES), the primary data collection source for teacher information. This federal data-collection and analysis study aimed to focus on three areas: supply and demand of teachers, development of meaningful indicators of teacher surplus and shortage, and the demographic, social, and institutional factors influencing current and prospective teachers. The stated goal of the CES was to provide full and complete statistics on the nation's public and private schools. Haggstrom et. al (1988) implemented a structural perspective to explore teacher retention and attrition which assessed teacher supply and demand trends nationally. The following issues impacted the design of the study: conditions impacting supply and demand differed by location, teaching field, and teaching levels; measures of supply, including teacher qualification were difficult to obtain; and most importantly, major structural shifts in the economy and labor force were difficult to project. Haggstrom et. al continued, explaining that structural factors such as family formation choices, occupational choices and policy-generated changes should be considered if projections and indicators were to be of value. Upon reviewing all of the federal and state data sets, research, Haggstrom et. al (1988) determined that the following data sources were needed to profile the teaching force:

- Dissaggregated data by field, level, sector and state to provide indicators of problematic areas of supply.
- Teaching assignments and qualifications which permit estimating the proportion of teachers in various categories as well as the ability to ascertain the quantity of uncertified and part-time teachers in certain areas.

- Demographic and Economic characteristics due to the overabundance of women and minorities in teaching
- Sources of Teacher Supply estimating the number of new teachers, migrating teachers, and returning teachers.
- Sources of Teacher Turnover which authors contend is the most important factor that needs to be understood.

Haggstrom et. al (1988) found that the data bases on teachers at CES did not contain adequate information to assess the current condition of teaching or to construct a future outlook for the profession. In response, they constructed four surveys to ask the "right" kind of questions for a better understanding of teacher turnover. This study, conducted by the Rand Corporation, continues to impact teaching retention and attrition studies due to the construction of The School Staffing Survey and Teacher Follow-up Survey, which educational researchers continue to analyze today (Darling-Hammond, 2003; Ingersoll, 2007; Kirby, 1999)

### **School Related Factors of the 1980s**

School related factors studied in relation to teaching retention in the 1980s included teacher to student ratio, teachers' involvement in decision making, administrative support, teaching level, student characteristics, and school location. Teacher retention correlated positively with increased decision making by teachers (Bacharach, 1990; Darling-Hammond & Wise, 1983), increased administrative support (Bobbitt, Faupel, & Burns, 1991; Metzke, 1988), and a positive initial field experience with education (Heyns, 1988). In general, secondary teachers left teaching more quickly than elementary teachers (Heyns, 1988; Keith, Warren, & Dilts, 1983; Murnane, Singer, & Willet, 1989). Secondary teachers in urban schools were also

found to have higher attrition rates (Corcoran, Walker, & White, 1988; Haberman, 1987). Although the aforementioned literature illuminated general patterns of teacher retention and attrition in the 1980s, the studies, all quantitative in nature, explored teacher choice *after* individuals made their given career move. Moreover, teachers were given prescribed questionnaires, which may have led them to certain answers instead of truly gleaning insight from their given experience.

For example, in 1991, Shen published the first of many studies based on a dataset from the National Center for Education Statistics. Deemed valid and reliable because of the large (almost 5,000) data set, Shen touted the study as reliable due to the broad spectrum of teachers, lending it to be generalizable. Here, over 3000 participants who stayed or voluntarily left were asked why they made the choice. Using direct discriminant function analysis, a multivariate technique, Shen grouped the teachers by variables such as gender, subject taught and salary. Although the correlation coefficients were low, he reported three positive correlations which he hypothesized as leading to increased retention rates: increased salary, increased teaching experience, and a positive personal perception of the general teaching profession. Leavers were found to do so early in their career, at schools with high minority populations or when they lacked traditional certification (Shen, 1991).

Throughout the 1980s, as evidenced by Murnane's et al.'s seminal work (1991), which reported on the career decisions of over 50,000 college graduates over 30 years, large scale, quantitative analysis was the valued source of data. Although valuable in sketching the outline of the teaching career patterns of teachers, there was little richness or depth to the studies. The data and analysis sought only to illuminate large trend data, which lacked nuanced description of context. No stories were told to explain the individual situations experienced by science teachers

as they made their career choices, which left out the richness needed to examine teacher choice. However, the policy ramifications of the 1990s as well as the teacher educational research of the 1990s contained multiple elements from the 1980s literature base, showing little, if any shift in thinking concerning exploration of the issues surrounding science teacher retention and attrition.

### **WAVE III: Excellence and Equity: The 1990s**

This portion of the review begins with a brief review of the pivotal reform documents during the 1990s until 2009. Next, the different personal and contextual factors impacting teacher retention are reviewed, followed by the overall trends of the research during this time period. Wave III of reform was influenced again by economic forces, this time focusing on the need for a systemic reform in science education in order to provide an equitable, rigorous education for all learners (Kahle, 2007). This wave, the strongest to date of the early 21st century, viewed school reform as a method to protect the United States in terms of national defense and economic stability through an education for all students. Corporate America purported a need for skilled labor that could read and write. The military added the need for technically skilled people for the new wave of jobs requiring technology skills. The general public decried the job of the public schools in educating students and mandated minimum standards for all graduates (Adisu & Caboni, 2004). Politicians and educators aimed to provide excellence and equity by focusing on four main aspects of education: (a) educating all students; (b) enumerating higher standards for education; (c) promoting a large-scale assessment process; and (d) establishing strict accountability for teachers and students. States were charged with overseeing this agenda.

### **ESEA Reauthorization of 1994: Improving America's Schools Act**

During the 1990s, states began implementing standards-based reform, in which policy makers specified what students should know and be able to do at different points of their schooling. In 1994, Bill Clinton, a champion of education, aimed to align the *Elementary and Secondary Education Act of 1965* (ESEA) with the standards-based reform states were experiencing. ESEA was constructed during Lyndon B. Johnson's War on Poverty, where it played a pivotal role in providing resources to schools during desegregation. The centerpiece of ESEA was the distribution of funds to local school districts based on the number of disadvantaged children served. ESEA's 1994 reauthorization, the Improving America's Schools Act (IASA) aimed to "enable schools to provide opportunities for children served to acquire the knowledge and skills contained in the challenging State content standards and to meet the challenging State performance standards developed for all children" (IASA, 1994). States were charged with creating and implementing content standards and assessing student progress based on standards. IASA also implemented a measure of adequate yearly progress (AYP) which aimed to identify schools and districts that needed to make improvement. However, most of the details about defining and measuring AYP were left to individual states to determine how and if schools met these requirements (Debray, 2005). Each discipline constructed standards, including science standards.

In science specifically, the American Association for the Advancement of Science (AAAS) published *the Benchmarks for Science Literacy*, which identified the appropriate science content to be taught in grades K-12 (1993). The National Research Council (NRC) published the *National Science Education Standards* (1996) which focused on all citizens becoming scientifically literate. Each document aimed to provide both excellence and equity to all students,

the goal was to promote high standards for all students, not minimal learning. Lee and Fraud (1998) studied the aforementioned documents and illuminated their commonalities. According to Lee et al, each of the documents shared definitive views of science achievement, which included a defined skill set, as well as knowledge of facts, commensurate with grade level. Each of the documents stressed integration of science with mathematics and technology as well. The social aspect of science, which included scientific literacy, appeared in each document, to varying degrees. Although the documents contained multiple similarities, there were also multiple discrepancies including content, pedagogy, application, and desired skill set of students. Lee et. al (1998) concluded that these reform documents doubled as political statements and educational goals. Although each document was designed to achieve equitable learning for all students, the documents contained too many desired outcomes for educators to successfully complete in a school year and left different schools or districts with the freedom to choose their own routes of assuring student progress and teacher monitoring.

In science education, the National Science Foundation (NSF) constructed the Statewide Systemic Initiative Program (SSI), an integral part of the third wave of reform in science education (Kahle, 2007). The SSI's worked under the premise that all facets of a system must focus on the same goals in order to achieve success. NSF partnered with 24 states over an eight year period with the explicit goal of implementing standards-based systemic reform in mathematics and science education. Multiple researchers (Clune, 1998; Laguarda, 1998) examined, at both state and national levels, the impact of the statewide systemic initiatives, finding mixed reviews of the implementation, which indicated that the large objectives of improved student achievement remained unreached. Clune's (1998) synthesis of the data from nine SSI states suggested that standards based teaching improved learning, but excellence in

education was not achieved through the top-down approach. However, in 2002, with the passage of *No Child Left Behind* (NCLB), schools, counties, and states began altering the landscape of the American school in an unprecedented manner, although no research supported this endeavor.

### **ESEA 2001 Reauthorization of 2002: No Child Left Behind**

Commonly heralded as an era of *common sense*, The *No Child Left Behind* (NCLB) inducement aimed to raise standards for all students while simultaneously closing the achievement gap between students of color and lower income students and their white, middle class peers by the year 2014. This reform was another reauthorization of the ESEA. Although these funds and accompanying policy had always focused on education, the current authorization focuses on three general themes: accountability, competition, and standards. During passage, Eugene Hickok, the Deputy Secretary of Education alleged that educators, particularly urban educators were bigots with excuses, who allowed low standards for students. For this reason, he and other politicians heralded that the government would “leave no child behind” (Hickok, 2002). Democrats Joseph Lieberman and Edward Kennedy crossed party lines to secure passage of NCLB while organizations such as The Education Trust heralded the legislation as inventive, believing that passage would work towards closing the perceived achievement gap between groups of students. This act specified that in order to receive federal funding, schools must make adequate yearly progress, as measured by state administered standardized tests in mathematics and reading, with the goal of 100% of students passing the tests by 2014. Building on the foundational work of Clinton’s ISEA, NCLB surpassed the requirements of ISEA in terms of emphasizing equal educational outcomes for students, imposing a timeline for improving student achievement, addition of subgroup accountability, expanding testing requirements to all students in public schools, and defining proficiency by a test score in reading and mathematics.

Corrective action under NCLB included “withholding funds, replacing personnel, removing one or more schools at the district’s jurisdiction, placing the whole district in state receivership or trusteeship, abolishing or restructuring the district, and authorizing students to transfer to schools in the other districts (NCLB, 2002, 1116c). Each of these options were present in IASA, however, NCLB added the “highly qualified” component (DeBray, 2005). Although states retained the right to define *highly qualified*, this involved content rigor, including certification by the state, holding a bachelor’s degree, and passing a test on basic skills and content within the subject area. Finally, NCLB required that schools receiving Title I funds implement practices based on scientifically based research. This legislation currently impacts who teaches, what is taught, as well as the consequences for perceived failure by teachers and districts. This literature review does not aim to explain the intricacies found in the NCLB inducement; rather, it described the document that is currently used to assess schools and teachers, which was salient in the upcoming body of research. Presently, all school districts in the nation assess students in third and eighth grades, then again in high school. Collectively, over 33 million tests are given each year by teachers (Karp, 2006) deemed “highly qualified”.

As evidenced by the above history, federal involvement in educational issues in about the year 2002 reached an all time high. Concurrently, the priority placed on mathematics and reading, in terms of accountability measures, has led to a decreased focus on research on science teachers and their respective retention rates. Throughout the following portion of the review, science teachers are mentioned, but they were not the primary focus of educational studies until the 21<sup>st</sup> century.

### **Educational Research Amid Wave III**

Collectively, the 1980s research explored individual teacher characteristics, such as age, sex, and other demographic characteristics. Building from the insight gained from research on individual teachers, the 1990s began with a push to explore school, district, and state-level characteristics impacting teacher retention and attrition (Strunk & Robertson, 2006). Although a small group (Harris and Adams, 2006) of researchers, used data from the CPS to generate a sample size of teachers as well as comparable groups that they determined to be nurses and social workers, asserted that teacher turnover was not higher than comparable professions, most researchers and policymakers disagreed, noting that nationally, the gap continued to increase between the supply and demand for “highly-qualified” teacher (Ingersoll, 2006; Neito, 2003). The National Center for Education Statistics (NCES) (1997) found in its report *The Condition of Education* that 22% of new teachers leave the teaching profession after only three years of teaching and that over half leave after only five years. In 2004-2005, NCES in its Teacher Attrition and Mobility Teacher Follow-up Survey found that 8% of public school teachers who taught during the 2003-2004 school year migrated to different schools and that 8% left the profession completely (Marvel, Lyter, Petola, Strizek, & Morton, 2007). Against this backdrop, researchers began to question the larger contexts in which attrition occurred. Of noted difference from the 1980s research is the focus on the individual teacher within an individual context of teaching. This portion of the review begins with both an explanation and examples of studies using economic labor theory to analyze teacher retention, a theory that continues to impact the study of teacher retention. Afterwards, the review emphasizes the major findings from the 1990s, highlighting the disaggregated data of both teacher and contextual factors impacting teacher retention.

## Use of Economic Labor Theory

Multiple researchers (Boyd, Lankford, Loeb, & Wyckoff, 2004; Haggstrom, Darling-Hammond, & Grissmer 1988; Ingersoll, 1999) utilized the economic labor theory of supply and demand to explain teacher shortages. Economic labor theory uses principles based on supply and demand to understand the problem, arguing that teachers will remain in the profession as long as teaching is the most attractive job available to them. Guarino et. al (2006) explained economic labor theory as a negotiation of salary, benefits, working condition, as well as personal satisfaction with factors influencing job choice. A basic assumption of this theory is that teachers acted rationally when making decisions about career trajectory. According to Guarino et al. (2006), shortages occur when demand surpasses supply in labor market theory. Guarino et al. (2006) constructed a review of all the empirical research of the 1990s based on this theory, which described the number of available teaching slots as *demand* and the number of qualified, willing teachers as the *supply*. Strunk & Robinson (2006) worked within economic labor theory as well, adding the distinction of “nested structure” to account for specific schools hosting or employing certain groups of people in distinct areas.

Ingersoll (2001) used regression analysis to analyze data from the *Schools and Staffing Survey* (SASS) and the *Teacher Follow-up survey* (TFS) with over 6,000 teachers from teachers the late 1980s and early 1990s. He attempted to separate the influences on teacher career into “teacher characteristics,” “school characteristics,” and “organizational characteristics” to explore teacher retention and attrition, contending that attrition was higher in teaching than in other comparable fields, such as nursing. He found a U-shaped pattern for attrition rates, with lower rates of attrition for older teachers and higher rates of attrition for younger teachers. Ingersoll found that science and mathematics teachers were more likely to leave teaching than their peers

in secondary settings as well as all elementary teachers. Ingersoll found that large, wealthy schools had higher retention rates than small, poor schools and that schools that fostered autonomous, influential environments for teachers to work, retained teachers. Critics of his work (Boe et al., 2008) cited inflation of Ingersoll's attrition rates since he aggregated the data, counting all people that leave the profession, even those that retire while others (Luekens et al. (2004) separated retirees out when reporting statistics. Ingersoll (2007) noted two main issues with teacher retention research: the lack of generalizable research as well as the lack of data that demarcated the difference between those teachers that left the profession and those that migrated to a different location yet remained in the educational field. Ingersoll cited multiple attrition and retention studies that focused on a given state or city (Grissmer & Kirby, 1992; Murnane, 1981; Murnane et al., 1991) where he described the context as a limitation. Ingersoll contended that other studies (Chapman & Green, 1986; Chapman & Huteson, 1982; Hafner & Owings, 1991) treated the topic of attrition and retention in isolation, without looking at broader ideas, such as the link between attrition and turnover. The next portion of the review explores teacher and district characteristics individually, exploring the major research informing each.

### **Teacher Characteristics**

**Experience.** Multiple researchers (Hanushek, 2002, Ingersoll, 2001, Murnane & Olson, 1989) utilized survey data from *the School and Staffing Survey* (SASS) as well as *the Teacher Follow-up Survey* (TFS) to examine different characteristics of teachers that left the profession. Four main areas: experience, gender, teacher quality, subject specialty, and psychological factors were most often studied. Across multiple studies, broad trends were found, regarding who tends to leave schools as well as the profession in general. Experience continued to strongly predict teachers' career decisions (Hanushek, 2002, Ingersoll, 2001, Murnane & Olson, 1989). For

example, in Murnane's study (1989), attrition rates dropped from 15% for first year teachers to 8% for third year teachers. Attrition rates dropped to less than 3% for teachers after eight years of teaching. Hanushek found similar trends in a sample of Texas teachers, which made a u-shaped curve. Leukens et al. (2004) analyzed NCES data, where he noted that teachers under the age of 30 were the most likely to leave a school. Teachers' age was one of the most accurate predictors of attrition, creating a u-shaped distribution, where younger and older teachers most often left.

**Gender.** Beyond experience and age, large, quantitative studies (Ingersoll, 2001; Boyd et al., 2005) found conflicting data on gender characteristics in regards to retention. These studies found increased attrition rates for males, which differed from previous studies (Murnane et al., 1993). Kirby et al. (1999) used longitudinal data from Texas teachers from 1980-1999 to find that white male teachers had a 5% lower rate of attrition than white females. Kirby et al. (1999) found that 16% of white male teachers left during their first year of teaching and over 26% by the end of their second year. Henke, Chen, Geis, and Knepper (2000) constructed a longitudinal study of 11,000 college graduates from the class of 1992-1993 from the database of *Baccalaureate and Beyond*. They found that women were more likely than men to choose teaching as a career.

**Teacher quality.** Multiple studies have explored variables linking higher teacher quality with increased rates of departure from the teaching field (Boyd, Lankford, Loeb & Wycliff, 2005; Hanushek et al., 2002; Ingersoll, 2006). Most often, quality was defined by scores on standardized tests. Strunk and Robertson (2006) found highly increased rates of attrition for teachers with advanced degrees. Loeb and Reininger (2004) examined teachers' test scores in relation to schools in which they taught. After reviewing the literature on teacher quality, Loeb &

Reininger, concluded, “there is a systematic sorting of the least qualified teachers into schools with the highest minority enrollments” (2004,p.27), which illuminated a possible equity issue.

**Subject specialty.** Research continually supports decreased retention rates of science teachers as well as special educators (Boe, Bobbit & Cook, 1997; Grissmer & Kirby, 1992; Ingersoll, 2001). According to the *NSF GPRA Strategic Plan*, the labor market for trained scientists has continued to increase dramatically, while the number of people receiving degrees in scientific fields has continued to decrease (2000). Strunk et al. (2006) believes this supports the need to increase wages for science teachers and others that are capable of making higher wages in other occupations. Henke, Zahn, and Carroll (2001) analyzed data on 700 collegiate graduates from 1993, 1994 and 1999 from the database *Baccalaureate and Beyond*, finding an attrition rate amongst teachers at 18% after five years, similar to jobs in health, law enforcement and the military. Henke et al. (2001) found that novice teachers that majored in STEM fields were less likely than teachers that had majored in education to still be teaching three years later, with a 30% attrition rate for STEM teachers, compared with 14% for all of the other teachers.

**Psychological factors.** During the 21<sup>st</sup> century, a group of researchers began focusing on psychological factors that lead to attrition or retention in education. Farkas, Johnson, and Foleno (2000) used nationwide survey data from 660 public school teachers with less than five years experience to answer questions concerning family related factors. Over 83% of these teachers felt that teachers must love their job to stay; 72% said they must feel like they are contributing to society in order to persist. Similarly, Johnson and Birkeland (2003) collected interview data for three years from 50 teachers in their first and second years of teaching in public schools, illuminating psychological factors that appeared to influence career trajectory decisions. Using purposive sampling, Johnson and Birkeland maximized diversity of sample through use of four

different sources to find participants. Building variability in individual factors of gender, race, ethnicity and age as well as contextual factors including population size and demographic factors, they began interviews. All 50 participants participated in a two-hour semi-structured interview. The following summer, Johnson and Birkeland conducted follow-up interviews with 47 of the original participants. Three years later, these researchers conducted a final round of interviews which found 28 participants working in their original school. Eleven of the 50 left the profession altogether, three left involuntarily and eight voluntarily moved to a different location.

Through the process of interviewing teachers over a three year period, Johnson and Birkeland learned what the stayers and leavers felt during each successive year. Across their study, the overarching theme of efficacy emerged to characterize the stayers. Satisfied stayers expressed contentment with their teaching assignments as well as their school context. Conversely, the leavers repeatedly listed factors including a neglectful administration, inappropriate or excessive teaching assignments, as well as a lack of resources. Johnson and Birkeland advocated for creation of a professional culture for teachers, which would include a functioning mentoring program and appropriate professional support. Moreover, they suggested that workload and teaching assignment should be commensurate with the new teacher's skill set. Finally, Johnson and Birkeland suggested that schools should shelter novice teachers in terms of workload and extracurricular duties while providing targeted professional development. Their study of teacher mobility provided the first in-depth rendering of career trajectory for a relatively large sampling of teachers. Using in depth qualitative methodologies, Johnson and Birkeland learned not only why teachers left, but also why they stayed.

## School and District Characteristics

There have been multiple large-scale studies using teacher surveys and interviews to identify the challenges faced by new teachers as well as the causes of the vast attrition rates from the teaching profession. Darling-Hammond (2003) found inadequacies in initial teacher preparation, questioning how teacher education programs prepared future teachers. Hendrick & Childress (2002) cited difficult first teaching jobs, low salaries, lack of administrative support, student discipline issues, and lack of autonomy, each of which related specifically to individual school contexts. Ingersoll (2002) noted a lack of power and voice over school policy while Friedrichsen et al. (2007) found general dissatisfaction with the teaching profession as a whole. The vast body of research on school and district characteristics has focused on salary, racial composition of schools and teachers, poverty rates, and administrative support.

**Salary.** Researchers have correlated increased salary with increased retention rates (Boyd et al., 2004; Ingersoll, 2001; Stinebrickner, 1998). Multiple researchers studied this trend at the state level (Hanushek, 2002; Murnane & Olson, 1989) while Ingersoll (2001) used national SASS data to illuminate the trend at a national level. Cornett and Gaines (1994) tracked the results of teacher retention incentive plans during the 1980s and found the limitations of these plans to include: (1) poor design, (2) susceptibility to leadership changes, and (3) little or no change in the schools or districts in terms of implementation. King, Swanson, and Sweetland (2003), reviewed the impact of school districts that increased and differentiated salaries for teachers due to teacher shortages in many states. Merit pay, group performance incentives, career-ladder-based pay, and overall increases to starting pay rates for new teachers were some ways in which states have conceptualized implementing this (King et al., 2003). King et al. (2003) suggested that a complete restructuring of the public school must occur in order to

successfully tie teacher pay with increased learning.

Hanushek, Kain, and Rivkin (2004) found in their quantitative analysis of teachers in Texas that a teacher's decision to teach in a school was driven less by salary than by context and job satisfaction, citing principal leadership, discipline, and safety as the greatest influences on their decision to stay or leave. Hanushek et al. (2004) found that to increase retention rates in low-performing urban districts to rates comparable to suburban districts would require extreme (25-43%) increases in salary (2004). Hanushek et al. (2004) suggested improving the working conditions in the schools instead of increasing the salaries, contending that doing so would be less expensive and more effective in attracting and retaining teachers.

Extending the work of Bobbit et al. (1994), Boe et. al reanalyzed the SASS data set from 1991 and the TFS of 1989, a dataset that provided sample data of the almost 41,000 teachers. They explored the data, looking for statistical significance between individual predictor variables and teacher choice. Boe et al. (1997) found that, other than teacher salary, research has lacked consistency when aiming to link teacher turnover and school characteristics or working conditions for teachers.

**School racial and ethnic composition.** Some research (Boyd et al., 2005; Hanushek, 2002; Theobald, 1990) indicated that schools characterized by a high minority population tend to have higher teacher attrition rates. Hanushek (2002) found a stronger correlation between teacher mobility and student demographics than salary rates. In Georgia specifically, Scafidi, Stinebrickner, and Sjoquist (2003) found that schools with a student population surpassing 47% African American have increased teacher attrition rates. The MetLife (2006) Survey of teachers found that in schools where minority students were given at least two-thirds of the student

enrollment, only 15% of teachers rated their satisfaction as excellent compared with 25% of teachers in schools where one-third or less of the student population was minority students.

**Matched teacher-student racial composition.** Research also indicated that white teachers are more likely than African American teachers to leave schools with high African American populations (Boyd et al., 2005; Hanushek, 2002; Scafidi et al., 2003). Boyd et al. (2005) found that white teachers were twice as likely to transfer from non-white schools to white schools or leave the teaching profession altogether. Scafidi et al. (2003) noted similar findings in Georgia. Similarly, Imazeki (2004) found that Black teachers in Wisconsin preferred teaching at schools with higher Black populations. Frankenberg (2009), in collaboration with the Southern Poverty Law Center, and the Civil Rights project, found that race, poverty, and language determined teacher demographics.

**Poverty.** Ingersoll (2001) found that low-income schools experienced increased teacher turnover. Likewise, Scafidi et al. (2003) found new teachers more likely to change schools early in their career in poor areas. This research suggested that the poorest districts encountered the most difficulty staffing their schools with qualified applicants. Hanushek, Kain, and Rivkin (2004) analyzed data on 300,000 Texas teachers from 1993-1996, confirming the U-shaped plot Grissmer found (1984). Ingersoll (2001) and Adams (1996) confirmed this curve with large data sets as well. They found that schools serving low performers on standardized tests as well as high minority populations were more difficult to staff than low-minority, high scoring schools. Clotfelter, Ladd, Vigdor, and Diaz (2004) investigated North Carolina's school accountability system put in place in 1996. These researchers found that teachers left low-performing schools at a higher rate and they found no evidence of improved teacher quality due to the accountability. Similarly, Neild, Useem, Travers, and Lesnik (2003) constructed a longitudinal study of

Philadelphia public schools from 1999-2003, that indicated the poorest schools had the most difficulty retaining and recruiting teachers.

**Administration.** In the NCES report constructed from the TFS from 2000-2001, Luekens et al. (2004) found that over 1/3 of the teachers that migrated were dissatisfied with their administration. For example, Louis, Marks, and Kruse (1996) found that delegating principals fostered a sense of collective responsibility for the students and schools, creating teacher buy-in. Blasé and Blasé (2004) analyzed questionnaires from 800 teachers, who described successful principals as those that fostered teacher autonomy, were visible at the school, and generous with affirmation. Useem (2003) studied 60 new middle school teachers in high poverty schools in Philadelphia, where twelve new teachers all left one school, due to lack of administrative support.

**Teaching assignment.** In 2004, the NCES analyzed survey data on teacher attrition and mobility (Luekens et al., 2004) and found that 40% of teachers moved to a different school to experience a more desired teaching assignment. Qualitative interviews (Johnson & Birkeland, 2003; Johnson et al., 2004) illuminated tensions new teachers faced when asked to teach subjects with which they lacked familiarity. The National Education Association (2003) found that 19% of teachers spent time teaching outside of their certification area. Ingersoll (2002) found that 12% of teachers in grades K-6 did not have an early childhood certification. At the secondary level, Ingersoll found that 20% of science and social studies teachers lacked certification in their area of teaching. In high poverty schools Ingersoll explained, “Not only are there more beginners in disadvantaged schools, but beginners in those schools are also less likely to be highly qualified” (p. 16). Case studies (Johnson et al., 2004) of new teachers revealed high levels of stress for those forced to teach out of field due to an inability to ‘stay ahead’ of students. Johnson

et al. (2004) concluded that teacher satisfaction decreased when they were asked to juggle multiple preparations or teach out of field. Similarly, Luekens et al. (2004) found that 24% of teachers that left teaching reported the work load too strenuous.

### **Impact of Accountability**

The Civil Rights Project (2004) at Harvard University reported on survey data from two urban school districts (Sunderman, Tracey, Kim, & Orfield; 2004) that teachers (in response to NCLB) “ignored important aspects of the curriculum, de-emphasized or neglected untested topics, and focused instruction on the tested subjects excessively” (p.4). Diamond and Spillane (2004) conducted intense case studies at low-income schools, and found that test-taking strategies were emphasized while higher level, meaningful instruction was displaced. Similarly, Kauffman (2004) found that new teachers in low income schools were required to exchange instructional time for test preparation in 45% of low-income schools, compared to 20% in high-income schools. Currently, no research was found that directly links accountability issues with teacher attrition; this is an area that the study being reported here addressed.

### **Alternative Certification**

Due to the vast number of teachers in this dissertation study that have acquired certification through non-traditional channels, a brief rendering of the research is provided.

### **Highlights from the 1990s**

In 1991, the National Center for Alternative Certification began publishing a document that described the different alternative certification routes in the states. By the late 1990s, commonalities in all teacher certification routes began to emerge. Due to the far-reaching need

for science and mathematics teachers, many alternative routes to certification were implemented. Often, nontraditional or alternative certification programs recruited applicants whose general demographics differed from those found in a traditional teacher-education program. Kirby, Darling-Hammond, and Hudson (1989) classified these programs into three main types. (1) Nontraditional recruitment programs that aimed to recruit teachers from nontraditional pools and provide them with the coursework they needed, with each teacher becoming fully certified, following individual state guidelines. (2) Alternative certification routes also aimed at recruiting from nontraditional pools and preparing students to meet altered state requirements. (3) Retraining programs that assisted teachers certified in different fields with achieving certification in mathematics or science. Kirby et al.(1989) studied nine of the 64 nontraditional certifications programs in the nation and found that approximately half of the recruits planned to continue teaching. Alternately, Clewell, and Vellegas (2001) evaluated the *Pathways to Teaching Careers Program* that was launched in 1989, which targeted minority paraprofessionals and emergency-certified teachers in urban schools. Over 2,500 participants enrolled and were compared with a national pool of newly prepared teachers. Pathways participants were 63% minority, compared to 18% and a mean age of 35 versus 28. After three years, over 75% of the Pathways participants were still teaching and another 13% were still working in education, exceeding the national sample.

Alternative certification routes have focused on both national and state-wide populations. Two national programs included *The National Science Foundation's Collaborative for Excellence in Teacher Preparation (CETP)* as well as Teach for America. From 1995 to 1998, CETP recruited and retained over 43,000 participants, each of whom completed a baccalaureate degree in education. Concurrently, over 37,000 participants completed post-baccalaureate

certification (NSF, 2000). Since 1996, TFA has placed over 2,300 teachers. The completion rate of the two-year commitment approached 90%, yet there is no data on retention after this initial commitment (Clewell & Forcier, 2000). At the State level, *The North Carolina Teaching Fellows Program* effectively recruited students with high GPAs and ACT scores to become teachers.

### **Alternative Certification in the 21<sup>st</sup> Century**

The 21<sup>st</sup> century has seen a huge influx in alternative certification routes; over 1/3 of all certification routes have been constructed since 2000. In 2007, all 50 states reported to the National Center for Alternative Certification that their state had implemented some form of alternative certification. In 2006, over 59,000 people gained certification through alternative routes, an increase from 39,000 in 2004 (Darling-Hammond, 2009). Current trends in alternative certification have focused on “broadening the net” to include older applicants that already have content expertise. These alternative programs have included emergency certification routes, which permit people to begin teaching without any teaching experience while taking classes on the weekend.

**Alternative certification in Georgia.** In Georgia specifically, alternative routes have continued to grow in popularity, along with Alabama, Florida, Kentucky, Louisiana, South Carolina, and Virginia. In 1999, almost 50% of new hires in Georgia were trained in different states due to lack of turnout by the colleges and the increased student enrollments. The Northwest Regional Educational Service Agency (RESA) constructed a program that the Professional Standards Committee approved, later naming it *The Georgia Teacher Alternative Preparation Program* (TAPP). This two year program, which aimed to recruit and train highly

qualified applicants, required participants to have a 2.5 or better GPA, a major in a desired field, a job in a public school, as well as criminal background clearance, and no teaching certificate. Participants took an eighty hour course the summer before they begin teaching as well as multiple classes via seminars throughout the following two years. The capstone of the course involved completion of a portfolio that aligned with state standards. Videos were taken of each participant to record the climate of the classroom as well as the pedagogies used by teachers. Each participant was assigned an on-site mentor who was tasked with spending at least 100 hours working with the candidate during their first year and 50 hours during their second year. Each TAPP student was also provided a school administrator, a system coordinator, and a program supervisor that collectively served as the Candidate Support Team (CST).

**Alternative certification and teacher retention.** There is some evidence that alternatively certified teachers leave teaching more quickly than traditionally certified teachers. Fisk et al. (2001) explored teacher retention rates of emergency certified teachers in Connecticut, finding teachers alternatively certified left at double the rate of traditionally certified teachers. In the state of Georgia, Guyton, Fox and Sisk (1991) compared test scores, attitudes, and pedagogies implemented by 23 fast-track certified teachers with 26 traditionally certified teachers and found similar results on all comparisons. Johnson et al.'s synthesis of research on teacher retention suggested that traditionally certified teachers reported enjoying the job more, suggesting improved retention rates (2005). This is another area that this study explored.

### **Science Teacher Retention Research: A 21<sup>st</sup> Century Phenomena**

Until the 21<sup>st</sup> Century, there was little research focused on science teachers specifically. As reported, disaggregated data on teachers indicated that science teachers faced different

challenges, leaving the field in higher rates, yet there was little research on these teachers specifically. However, there is currently a plethora of national reports from high-profile groups including the National Academy of Sciences (2006), the U.S. Department of Education (2002), and the National Research Council (2002) which has directly correlated teacher shortages in science and mathematics with lackluster student performance. However, these political documents have lacked academic research supporting them.

Since 1999, Richard Ingersoll has used SASS and TFS data to explore issues of teacher retention and recruitment, providing in depth analysis on science specifically. As evidenced throughout this review, he has focused his scholarly endeavors on large quantitative data sets, illuminating trend data. In 2006, Ingersoll reported approximately 223,000 science teachers were teaching in America's schools. Approximately 53% of these teachers migrated from another school, 32% were new to teaching and 15% returned from the reserve pool. During the same time span, 12,000 science teachers graduated from universities. Ingersoll found large variations on teacher shortages in physical sciences (38%) and biology (31%) disciplines which were very difficult to replace with new teachers. Although other subject areas have similar needs, in terms of the amount of teachers, other fields do not experience the difficulty replacing those that quit. In the sciences, retirement accounted for only 12%-14% of the attrition, across all five cycles of SASS/TFS from 1988 to 2004. However, job changing and dissatisfaction with the career accounted for over 25% of the turnover of science teachers (Ingersoll, 2009). Reasons for dissatisfaction included inadequate planning time, lack of teacher input in decision making, large class sizes, and inadequate supplies. Collectively, Ingersoll summarized the SASS data to assert that there were plenty of certified science teachers, but there were not enough people willing to teach. Ingersoll (2006) and others (Desouza, J. & Czerniak, 2003; Koballa & Bradbury, 2009)

have suggested that mentoring teachers increases science teacher retention.

Although varying definitions of mentoring abound, mentoring generally focuses on pairing new teachers with more experienced teachers in a given field. Smith and Ingersoll (2004) found that teachers who participated in mentoring were more likely to persist at their school when provided with a mentor in the same subject field, participating in planning and collaboration with other teachers. Luft, Roehrig and Patterson (2004) looked specifically at the induction of science teachers, yet none of their research focused on teacher retention in relation to mentoring. Friedrichsen et al. (2007) used a case study design of 18 beginning teachers' perceptions of support during their induction year of teaching mathematics or science. Using a grounded theory approach, these researchers found that teachers provided with mentor teachers, as well as connections with other novice teachers, were more likely to persist. Bellamy and Cooke (2003), in their comprehensive review of the literature on mentoring and induction and the retention of science teachers, identified improved relations between new teachers and their colleagues through induction, which hints at the work of Sheila Tobias.

Tobias (2009) engaged with Ingersoll's work and began exploring the complex issues of science teacher retention. She first explored the *Teacher Follow-up Survey* (TFS) and found that 30% of science teachers left teaching to pursue another career while over 20% of science teachers left due to dissatisfaction with their school or current teaching assignments. Using this data as well as qualitative data, Tobias constructed the argument that school culture and a lack of professional working conditions undergirded science teachers' attrition. Byrd's (2007) findings supported Tobias' contention. Byrd studied science teachers from South Carolina who left the profession, asking them what could cause them to return. Findings included increased salary, improved school leadership, and strong community partnerships. Collectively science teachers

remain an understudied group, in terms of why they leave the profession or choose to stay. The data collected on science teachers is topical in nature, consisting of teachers filling out prescribed surveys after they have left the profession, not during the decision making process.

### **The Rural Context**

This review ends with a snapshot of rural areas, due to the location of this dissertation study. Excluding the Rural Systemic Initiatives in Science, Mathematics, and Technology Education Program which examined the ‘third wave’ of systemic reform in action in rural settings, there is very little research on science teacher retention in rural areas (Arnold, 2005; Brownwell et. al, 2005; Ingersoll, 2007). There is general consensus that rural schools present a unique context for schooling in comparison to urban and suburban schools (Arnold, 2005; Horn, 2005). Rural schools operate under the same laws and with comparable expectations and goals as their urban and suburban counterparts yet few scholars are studying rural education issues, and almost no funding is available to conduct education research in specifically rural contexts (Arnold, 2005; Sherwood, 2000). For example, in rural settings, one student failing to meet an academic goal such as passing a graduation test greatly impacts results for the whole school, whereas multiple students must fail to impact suburban or urban schools (Powell et al., 2009). In science education, the Rural Systemic Initiatives and the related studies remain the most in depth coverage of rural areas.

### **The Rural Systemic Initiatives**

The Rural Systemic Initiatives (RSI) incorporated a mixed method study to explore science and mathematics teaching in rural schools over a five year period. Certain school and community parameters, including at least 30% of participants living in poverty were required for

participation in the study. The RSI constructed six “drivers” which informed the research project. Drivers focused on multiple topics, ranging from implementation of standards-based curricula to serving all students, especially those historically marginalized. Using qualitative case study methodology, researchers reported that many teachers were uncertified in the science content areas. In particular, one rural school had 100% of their math and science teachers provisionally certified. This same school experienced a 70% turnover rate collectively (Horn, 2004). This vast report examined multiple aspects of rural schooling amid systemic reform, yet it failed to address the issues underlying the teaching turnover in general or science education. Other researchers (Stockard and Lehman, 2004) studied sample data of 379 public schools teachers from the Schools and Staffing Survey from 1993-1994 as well as the 1994-1995 Teacher-Follow-up Survey to find that schools in the West as well as other small towns had increased attrition rates. In terms of teacher retention, homegrowing teachers has become the most popular means to combat the problem of teacher turnover in rural areas, yet there remains a dearth of research (Collins, 1999; Darling-Hammond, 2003; Lemke, 1994).

### **Homegrowing Teachers**

In an effort to diminish consequences of the teacher shortage, many rural school districts began trying to home grow their teachers, a suggestion of multiple researchers (Collins, 1999; Darling-Hammond, 2003; Lemke, 1994). Homegrown teachers are connected to their schools, their community and the prevailing values of the area. However, there is little research on the impact of this policy on student achievement or teacher retention (Huysman, 2008).

## Generalities of Rural Schools and Communities

Since each rural school and community is very unique, constructing a universal set of core characteristics to describe or define them (Herzog & Pittman, 2003; Lewis, 2003; Oliver, 2007; Sherwood, 2000) Kathleen Budge (2006) demarcated common strengths and challenges that she believes cross the spectrum of rural areas, and are salient in the context of this study.

Multiple researchers supported her findings, as outlined in the table below:

Table 2.1

### *Summary of Rural Characteristics and Associated Scholars*

Rural Characteristics	Supporting Research
Low population density and isolation	Beeson & Strange, 2003; Stern, 1994; Oliver, 2007
School and community interdependence	Collins et al., 2001; Herzog & Pittman, 2003; Tippins & Mueller, 2009; Kannapel & DeYoung, 1999; Lane & Dorfman, 1997; Stern, 1994
Oppression as lived experience	Hammer, 2001; Haas & Nachtigal, 1998; Herzog & Pittman, 2003; Nadel & Sagawa, 2002
An “out migration” of young talent	Hammer, 2001; Howley et. al, 1996; Nadel & Sagawa, 2002; Smith, 2003
A salient attachment to place	Haas & Nachtigal, 1998; Howley, et al., 1996; Kemmis, 1990; Porter, 2001

In Huysman's dissertation study (2008) of rural schools, he states:

The study revealed a complex intertwinement among rural teachers' personal, social, and professional lives. Unlike teachers in suburban or urban schools who can leave their job at work, teachers in small rural school districts must continually socialize and interact with colleagues in the community. Relationships among families, parents, couples, children, friends, and rivals cannot be left outside the school doors. The result is a complex dance of perceptions and realities, long-standing animosities and alliances. These complexities are what teachers most enjoy about teaching in a rural district but are, at the same time, the source of many frustrations. (p.278)

### **Conclusions and Preview**

Huysman's description of rural schools illuminated the difficulty in studying rural education. By reviewing the literature on teacher retention and attrition throughout the last two waves of reform, an incomplete picture of teaching in rural areas emerges, especially in areas where the circumstances differ from traditional suburban or urban schools. This study aimed to contribute to the scholarship in science education through the in depth study of teacher persistence in Five Points County and three contiguous counties, with the explicit goal of understanding teacher choice and career trajectory, during this third wave of accountability. Chapter three begins with a rich exploration of the context of the study. Next, the individual participants and their communities are introduced. Next, a detailed explanation of the methodological framework and modes of analysis are discussed. This chapter concludes with the ethical considerations associated with the chosen methods.

## **Chapter 3**

### **Methods and Methodology**

This chapter begins with an overview of the methodological framework that guided construction of this inquiry. This overview is followed by a description of the historical background of the study's setting, and an introduction of each of the individual school settings and participants. The final section examines the individual methods utilized for data collection as well as the data analysis framework that guided the inquiry.

### **Methodological Framework**

Bentz and Shapiro (1998) utilized the phrase "culture of inquiry" to describe different ways in which researchers choose to study the world (p.88). The culture of inquiry, or methodology, served as a guide that helped to answer the research questions in the most appropriate manner. This study utilized an interpretive approach (Erickson, 1986) to explore the tensions impacting science teacher retention in a rural area.

The researcher utilized an interpretive approach (Erikson, 1986) in the research process in order to glean each participant's individual human construction of the teaching experience. This methodology aligns with the researcher's subjectivity that humans first create meaningful interpretations of the world, and then take action in response to their interpretation. Since each individual may interpret the meaning of a situation or object differently than another person, the researcher employed multiple methods of data collection to triangulate findings. Erickson (1986) explained that researchers must differentiate between the behavior, or the physical act, and action, which is identified as the actual behavior in addition to the interpretations of the

individual. The researcher focused on the action of individuals, not the behavior due to the assumption that people make choices, taking action based on their interpretations of the actions of others, which differs from traditional quantitative research.

Historically, interpretive research has focused on both subjective meaning and the ecological circumstances of the individual, while focusing on the social aspects that surround a given phenomena. This methodology is consistent with the research questions that guided this study, which focus on each participant's perception of the tensions impacting the individual's job. Traditionally, interpretive researchers (Tobin & McRobbie, 1996) have aimed to understand the specific ways in which social organization and culture relate to the choices that individuals make. This focus has promoted allowed researchers (Theobald, 1996; Tobin & McRobbie, 1996) to construct "concrete universals" which describe in depth a given situation instead of "abstract universals" derived by statistical generalizations about a group of people. Erickson (1986) explained that interpretivist methodologies sought to show illuminate universality and uniqueness concurrently, as purposed with this study. Specifically, Erickson outlined five ways in which interpretive research may inform educational research:

- By making the familiar strange and interesting again: problematizing the common
- Explicating the need for specific understanding of a context through detailed observation
- Prioritizing the *local meanings* for individuals and communities
- Considering the need for a comparative understanding of different social settings
- Considering the need for comparative understanding beyond the immediate circumstances of the local setting

Each of these points resonated with the purpose of this study. After an exhaustive review of the literature on science teacher retention, the researcher believed that a deeper study of individual teachers' understandings and interpretations of their job would render a nuanced perspective of the decision making process teachers undergo. By making the familiar strange and privileging the actual decision makers' (teachers) thought processes and subsequent choices regarding their career, new understanding might emerge.

### **Research Context**

As a first year doctoral student, the researcher began working in Five Points County (pseudonym) where she helped to implement professional learning in Five Points Pre-K-12 Charter School (FPCS), the only public school in the county. Five Points, the county with the smallest population in the state of Georgia, was characterized by a declining population as well as one of the highest poverty rates in the state (Boatright & Bachter, 2006; Census, 2007). After exiting the interstate, there was one convenient store and a sign pointing drivers towards the Five Points Charter School (FPCS). Started in 2000, FPCS failed to meet state-level goals, which made it eligible for Title I funds and Teacher Quality Grants. FPCS also failed to make Adequate Yearly Progress, which placed it on the "Needs Improvement" (Georgia Department of

Education, 2007) list. During the 2008- 2009 school year, approximately 90% of the 280 students that attend FPCS were African American and over 70% of the students were eligible for free breakfast and lunch.

For three years, the researcher collaborated with a group of 20 teachers where she assisted in construction of professional learning workshops about multiple topics, including science and literacy integration, inquiry based science instruction, as well as other curriculum and pedagogical topics. The researcher also worked in the teachers' classrooms throughout the years, building relationships with them and their students. She ate lunch with the teachers, listened to their stories, and watched the dynamics of this very rural school, which dramatically differed from her years of teaching in the suburbs of Atlanta. During the years, the researcher witnessed the impact of teacher turnover in Five Points and the difficulty the school system faced when endeavoring to replace teachers. This led to the creation of a study focused on science teacher retention, migration, and attrition in this rural, understudied area. Since Five Points PreK-12 Charter School employed only two science teachers, one for the middle school and one for the high school, the researcher sought other schools with similar population sizes and demographics in order to increase her number of participants so that she could compare and contrast different teachers' understandings of multiple contexts. After exploring census data as well as talking with members of FPCS, the researcher used purposive sampling (Patton, 2002) to choose the rest of her schools and participants.

Three counties, each of which borders Five Points County, were chosen as sites for this inquiry, due to their similarities in student and teacher demographics as well as proximity to Five Points. Each participating school served as the only public secondary option for each county. The schools were each a part of the same Regional Service Agency, a division constructed by the

professional standards commission within the state of Georgia. This identification has encouraged teachers and administrators to compete with one another in regards to standardized test scores. The schools also competed in regional athletic and academic events, and many of the teachers have taught at neighboring schools throughout their career. The population demographics of each county were characterized by a majority of African American and Caucasian students, with less than 1% of other ethnicities. After gaining access to each of the schools, the researcher spent time building relationships with the science teachers at each of the remaining three locations. The following chart details the demographics of each of the schools in the study. Since context is invaluable in this study, the next section provides a brief history of the Black Belt region, home to each of the studied schools.

**Table 3.1***Specific Demographic Information for Schools in Study*

School Name	School Size	Economically Disadvantaged Students	Student Demographics	Graduation Rate 2009
Five Points PreK-12 Charter School	219	94%	95% African American	68%
Gray County High School	536	77%	70% African American 30% Caucasian	75%
Lorraine County High School	448	59%	65% African American 35% Caucasian	76%
Wilson County High School	478	70%	65% African	89%

## **A History of the Counties within this Study**

For many people living in the area known by sociologists as the Black Belt region of the United States, stories of slavery, emancipation, reconstruction, and New reconstruction are told by grandparents whose parents were slaves in the United States of America. This area, also known as the “cotton counties” and the “plantation counties” is considered by many to have a distinct milieu, denoting it as a region, even though it stretches through multiple states. Although some scholars disagree with generalizing about this particular area of the United States, others (Falk & Rankin, 1992; Hoppe, 1985; Webster & Bowman, 2008) contend that a collective identity exists in this region. Markusen (1987) defined a region as “[an] historically evolved, contiguous territorial society that possesses a physical environment, a socioeconomic, political and cultural milieu, and a spatial structure distinct from other regions and major territorial units” (p. 17). Falk & Rankin (1992) asserted that “there is no other place in the United States that includes such a large geographic territory, with so many people of one race, with so much common history”(p.302)

Although the Black Belt lacks one prevailing definition, the literature suggests four historical uses of the term. The Mississippi Delta (Gotsch-Thompson, 1984), with the richness of the soil and use of the earth, is often cited as the inspiration for the name. Others (Bogie and Harrison, 1982) suggested that the term was utilized as a descriptor of the people who reside in the area. Odum (1934) stated that the Black Belt region is simply the old cotton states. Others have quantitatively (Falk and Rankin, 1992) demarcated the area based on characteristics such as the number of African Americans that live within the area. Falk and Rankin (1992) defined the Black Belt as a region characterized by an African American population greater than 33%, a percentage that is three times higher than the national average in the United States.

Geographically, the Black Belt stretches from Virginia and Maryland, through the Carolinas and Florida, across Georgia, Alabama, Mississippi, Louisiana and Texas. In Georgia, this region stretches through 79 of Georgia's 159 counties, beginning at the border between Georgia and South Carolina, and continues southwest to the Georgia-Alabama-Florida border. The following discussion illuminates the historical context of the Black Belt Region of Georgia.

**From emancipation to the Civil Rights Movement: The Black Belt took front stage.**

During the Antebellum period, the slave population of Georgia was second only to Virginia, with over 400,000 slaves. Slaves worked the land, supplying farm labor: people were the mobilizing mechanism. As Bartely (1990) noted, within plantation societies, there were three specific groups of people: wealthy landowners, non-land owning free class, and slaves. Prior to the Civil War and following the war, only about half of the whites owned land while the others faced very limited economic options. When slavery ended, the plantation system did not: however it changed. Mandle (1978) described a plantation economy as:

One in which profit maximizing agricultural landowners depend upon some mobilizing mechanism, not simply the operation of a free labor market, to satisfy the need of their farms for disciplined, unskilled workers in large numbers. (p. 12)

After the Civil War, tenant farmers became the mobilizing mechanism for plantations. In sharecropping, tenant farmers worked land owned by another. In return, the tenant farmer paid the owner a portion of the crop. By 1874, Blacks in Georgia owned over 300,000 acres of land, assisting in production of the largest cotton crop in history. The second factor that promoted continuation of the plantation economy was the absence of other job opportunities for unskilled workers, especially Blacks, who faced discrimination in the North as well. Of the 5.6 million

jobs created between 1890 and 1910 in manufacturing in the U.S., only 381,000 were in the southern states, home of the plantations (Mandle, 1978). Less than 50 years ago, inequality continued to ravage this place, as evidenced by the story of desegregation.

**Desegregation in Five Points County.** In 1965, Five Points County gained national attention in the quest to desegregate. On October 1, 1965, African American high school students protested continued segregation of local schools. Instead of integrating, all of the white students were transferred to neighboring county schools in Gray and Wilson Counties. As evidenced in a video clip (The Civil Rights Digital Library, 2009), student Frank Fay explained to a patrol officer that he wanted to go to an integrated school. Fay asked why they (Black students) were forced to attend a second class school and the patrol officer told him his job was to enforce the law, not explain it. Later, during the spring of 1965, the local school board refused to sign the contracts of six Black teachers. Previously, the teachers fought for the rights of the Black children to use the only gym in the county, where white children practiced. Concurrently, 88 Black students applied to transfer to the all-white Alexander Stephens Institute that was scheduled to desegregate in the fall. In response, all of the white students transferred out of the county. At this time, since there were not any white students, the Five Points County School closed, and the Black students returned to an all Black high school. They were not told that the school would close until after the registration dates for the neighboring counties of Gray, Wilson, and Lorraine Counties had passed, which forced continued segregation.

At this point, the Southern Christian Leadership Conference (SCLC) created the Freedom School which peacefully demonstrated every morning as the White students were bused to other counties. In response, Leroy Johnson, the first African American elected to the Georgia Senate, visited Five Points County on Sunday, October 3<sup>rd</sup>, 1965. Here, Johnson described Five Points

County as a “powder keg,” citing insufficient communication between the Black and White communities as “the most disturbing aspect about the situation.” While Johnson shared these concerns with the media, he told of the threat that Governor Carl Sanders made concerning the students boycotting the segregated schools. Gov. Sanders threatened to send the boycotting students in the segregated schools to reform school. Instead, Johnson advocated, “what is now needed is courageous and forthright leadership.” He suggested that the governor should encourage local leaders to make desegregation a reality.

Hosea Williams and Martin Luther King, Jr. of the SCLC joined the effort to integrate Five Points County at this point. Promising to see the job of integration through, Dr. Martin Luther King, Jr. and Hosea Williams brought support from the SCLC to the county, with accompanying news outlets. In response, Georgia’s Grand Dragon Calving Craig assembled over 200 members of the Ku Klux Klan to protest integration. Just forty-five years ago, on November 17th, 1965, under federal court order, African American students from Five Points County integrated the neighboring schools, without any physical violence (Time Magazine, 1965). In multiple cases, the students attending each of the schools in the county have heard these stories from parents and grandparents who lived this experience. Many of the “homegrown” participants in this study have their own understanding of the events associated with desegregation in this area, and the residual impact on education.

**Socially and economically.** Jerome Morris (2009) asserted that the “new south,” popularized by the media does not exist in most southern, rural areas. He explained that although there were prosperous urban areas, such as Atlanta, Dallas, and Houston that characterized the “new south,” while the rural areas lagged behind socially, politically, educationally and economically. Multiple researchers (Levernier & White, 1998; Webster & Bowman, 2008) have

indicated through quantitative analysis that poverty rates in the Black Belt region have consistently surpassed the rest of the state and nation. Economically and socially, the Black Belt region developed from the plantation economy where the cultivation of sugar cane, tobacco and cotton for export and trade increased linearly with the increase in imported slaves. After the Civil War, the Blacks that remained were socially, economically, educationally, and politically disenfranchised due to Jim Crow laws that perpetuated racial divisiveness and unequal treatment (Duncan, 1996). During the 1900s, the Southern economy began to incorporate service jobs as well as new industry. Those with more education and wealth emigrated, concentrating in urban centers, creating a highly developed infrastructure, as evidenced by *new south* economies. In the rural south, the labor oriented jobs in industry, which paid low wages replaced agriculture (Coclough, 1988), which exasperated the concentrated poverty within the Black Belt region of Georgia. According to Duncan (1996) Black citizens that chose to migrate out of the south often did so in search of increasing their economic potential, which further exasperated the poverty problem by leaving people who were the least able to leave in the fewest economic options.

In the 21st century, Black Belt poverty continues to increase. Poverty in the Black Belt is 41% higher than Southern counties not located in the Black Belt. The per capita income is lowest in the rural Black Belt counties and the poverty rates are the highest (Falk and Ranking, 1992; Webster & Bowman, 2008). When examining poverty geographically, some researchers have concluded that it is a southern, rural problem (Massey and Fischer, 2000; Wilson & Bowman, 2008). Compared to urban residents, rural residents have decreased work experience, more frequent job transitions and higher rates of unemployment and underemployment (Jensen et al, 1999). These negative tensions are magnified for women, blacks, single and less educated people (Haynie & Gorman, 1999).

Webster and Jerrod (2008) remind readers that the Black Belt Region played a “dominant role in the two most important events in the South’s history, the Civil War and the Civil Rights Movement” (p.4). In 2008, they reviewed the literature associated with the Black Belt region, creating a synthesis of the characteristics of that describe the region in relation to state and national averages. Compared to the whole United States, the Black Belt Region had increased percentages of : African American people, poverty rates, infant mortality, and democratic voters. Webster and Jerrod (2008) utilized factor analysis based on the composite Black Belt characteristics derived from the literature to measure the demographic, social, economic and political factors within each county. Their recent study indicated that each of the counties within this study are part of an area that remains distinct from the rest of the state, with regard to the listed rates of demographic trends, poverty rates, health care issues, education attainment and population growth.

### **Research Participants**

Although this study does not suggest that each participating school is the same, they were purposively chosen, due to their demographic, economic, and political similarities that were evident, especially at the school level. Moreover, the schools have a shared history that continues to impact teachers in the counties. Many of the participants have taught at or attended other schools within this region.

### **Selection Criteria**

The researcher utilized purposive sampling (Patton, 2002) to recruit participants for this study. The researcher examined Census Data as well as historical documents to decide on which counties were most similar to Five Points County educationally, economically, and politically.

The researcher then explored her contacts at the University of Georgia, including her major professors, in search of contacts within the districts. At least one teacher within each of the districts attended UGA at some point, which became the point of entry at the Gray, Lorraine, and Wilson County schools. During the first month of the study, the researcher visited each of the schools, where she led a meeting with the science teachers at each of the schools, and explained the purpose of the upcoming study. All of the science teachers at each school were invited to join the study. Participants were divided into two categories: primary and secondary participants. Primary participants included science teachers that participated in multiple interviews, focus groups and demographic mapping while secondary participants were community members or members of the school's leadership whose involvement was less intense, in terms of time and participation. Secondary participants participated in one focus group and two interviews. Table 3.2 describes the final participant list, including primary and secondary participants.

Table 3.2

*Demographic Information Provided by Participants*

Participant Name	School Name	Primary or Secondary Participant	Male or Female	Years Teaching	Cultural Group Identification	Homegrown Status	Length of Commute	Certified in Field	Education Level
Pat	Five Points	Secondary	F	18	Caucasian	No	40 miles	Yes	Ph.D.
Amy	Five Points	Primary	F	9	African American	Yes	40 miles	Yes	M.Ed
Dexter	Five Points	Primary	M	1	African American	No	40 miles	In Progress	M.Ed
Brittany	Gray	Primary	F	1	Caucasian	No	45 miles	Yes	M.S.
Carrie	Gray	Primary	F	33	Caucasian	No	25 miles	Yes	M.Ed
Brady	Lorraine	Primary	M	10	Caucasian	Yes	10 miles	Yes	M.Ed
Jason	Lorraine	Primary	M	30	Caucasian	Yes	2 miles	Yes	M.Ed
Hailey	Lorraine	Primary	F	10	Caucasian	No	20 miles	Yes	M.Ed
Brandon	Lorraine	Secondary	M	8	Caucasian	Yes	35 miles	Administration	Ed.D.*
Jessica	Wilson	Primary	F	6	Caucasian	No	2 miles	Yes	Ph.D.*
James	Wilson	Primary	M	3	Caucasian	No	2 miles	Yes	M.Ed*
Mary	Wilson	Secondary	F	8	African American	Yes	4 miles	Yes	M.Ed

## Methods

Table 3.3

*Matrix of Research Questions, Integrated Timeline and Data Sources*

Data Sources	Date of Data Collection	Overarching Research <i>What tensions do science teachers experience regarding career persistence in rural schools?</i>	Guiding Question 1: <i>How are these tensions associated with professional dimensions of rural science teaching?</i>	Guiding Question 2: <i>How are these tensions associated with personal dimensions of rural science teaching?</i>	Guiding Question 3: <i>How are these tensions associated with contextual dimensions of rural science teaching?</i>	Overarching Research Question 2 <i>Within the context of this study, what implicit or explicit cultural myths impact science teacher retention?</i>
<b>Both primary data sources</b> <i>italic=secondary sources</i>						
<i>Demographic Map</i>	February-March 2009					X
<b>Life History Interview</b>	March-May 2009	X	X	X	X	X
<b>Focus Group 1</b>	April-June 2009	X	X	X	X	X
<b>Semi-structured Interview</b>	July-September 2009	X	X	X	X	X
<b>Focus Group 2</b>	September-October 2009	X	X	X	X	X
<i>Archival Data</i>	March-September 2009					X

*Note.* The primary methods utilized are highlighted.

Six specific sets of data were collected with goals associated with each data source. Table 3.3 illustrates how each data set correlated with the overarching research questions.

### **The Demographic Map**

The demographic map consisted of a ten question on-line survey that participants filled out prior to participating in their first interview. This survey elicited demographic information regarding each participant's years of teaching as well as other background information (See Appendix 3.1). This information provided the researcher with general knowledge of each person prior to the interviewing, which allowed the participants to begin telling their stories without spending time on demographic questions which are easily answered through a survey.

### **Interviews**

Two distinct types of interviews were used in this study: life history interviews and focused, semi-structured interviews. All interviews were digitally recorded and transcribed word for word. Transcriptions were then coded using constant comparative analysis methods. Further explanation of analysis is provided in the Data Analysis section. Each of the primary participants participated in a life history interview as well as a second interview that was conducted after primary analysis of the life history interview as well as completion of the first focus group. The researcher implemented life story (Goodson, 2006) interviewing as an individualizing device for the ten participants in the study.

Since this study aimed to deepen the understanding of tensions impacting science teacher retention, recruitment and attrition, the perspective of each participant was considered of equal importance. The life story interviews sought to capture the unique perspective of each participant. Each life story interview began unstructured, due to the desire of the researcher to hear the life storytellers share their narrative with as little interruption as possible. Throughout

the life story interview, the researcher probed (Appendix 3.2) when she felt the storyteller desired guidance on where to explore next. After listening to the life story interviews from participants and completing a preliminary analysis of the data, the researcher constructed the second round interview probes for the semi-structured interviews.

Preliminary analysis (Charmaz, 2006) of interviews also informed construction of focus group protocols.

### **Focus Groups**

Science teachers from each school participated in two different focus groups, which were designed around the tensions gleaned from analysis of individual interviews (See Appendices 3.3 and 3.4). In the 1940s implemented “focused interviews” to study the effect of “morale” films on soldiers. In the 1990s, this method of inquiry gained popularity as well as legitimacy in terms of a method of inquiry in marketing (Merton, Fiske, & Kindall, 1990). The goal of the focus group was not for participants to provide short, quick answers that a survey could readily illuminate; rather, the focus group aimed to engage participants in a thought provoking discussion in which they interacted with people considered their peers at each school. Coupling focus groups with the individual life story interview provided participants with the opportunity to explore their individual views as well as those of their peers while providing the researcher with rich data on the dynamics within each particular school. Patton suggested that researchers implement homogenous groupings to encourage open dialogue. The researcher opened the focus group to all science teachers at each school, which provided an opportunity for participants to dialogue about their interpretation of the context.

During the first focus group, the researcher's explicit goal was to construct an understanding of the dynamics surrounding standardization and accountability in each of the studied schools. During preliminary analysis of each of the life story interviews, each participant mentioned issues associated with the standards and accountability at their school. Each of the schools either currently has failed to meet AYP or has just met the bar set by the state. Since each participant mentioned this issue, the researcher constructed a focus group protocol based on the findings from the life story interviews. The researcher desired a deeper understanding of the mindset in these rural schools concerning the perceived abilities and future goals and aspirations that teachers have for their students (See Appendix 3.3). The second focus group explored career trajectory at each school. The researcher strategically timed the second focus group to occur after the second round of individual interviews in which each participant answered individual questions concerning their plans for the next school year. This timing was chosen to ensure that each participant had made decisions concerning their individual career choice for the following year, having signed their contract, or having told their administration they were not returning. This timing allowed each participant to openly discuss how and why they made their individual decisions while collectively relating to one another and their individual school (Appendix 3.4). The researcher scheduled this focus group after participants had officially made his/her decision regarding their career trajectory for the next school year.

### **Data Analysis Overview**

Data analysis consisted of three main phases, which began as the researcher collected life history interviews, and continued for fifteen months, due to the depth and quantity of data collected. The researcher continually alternated between analysis phases, returning to transcripts from focus groups or other interviews as she explored tensions and integrated theory to help understand emergent tensions. Although the explicit goal of analysis was the Generation of Assertions, each phase of the inquiry was of equal importance in the endeavor.

#### **Phase I: Initial Coding**

Phase I of analysis consisted of using constructivist grounded theory techniques described by Charmaz (2006) to organize the vast data set acquired. Chamaz (2006) situated herself as a critical interpretivist who “builds on the pragmatist underpinnings in grounded theory and advances interpretive analyses that acknowledges these constructions” (p.10). Specifically, after transcribing each participant interaction and reviewing the reflective memos associated with each source, the researcher created a code that described each line of the data. While coding, the researcher utilized Charmaz’s ‘gerund’ technique, which encouraged her to detect processes and stick closely to the individual set of data (Glaser, 1978). After completing data collection for the study as well as preliminary analysis, the researcher re-entered the documents, focusing the coding on the experiences, actions, and interpretations that teachers within and across schools made during the interviews and focus groups. At this point, the researcher collapsed the initial code set, from 400 gerunds to ten theoretical domains with the greatest relevance regarding science teacher retention and attrition.

## **Phase II: Analytic Vignette Construction**

Although the researcher divided vignette construction and key assertion generation in two distinct phases, they occurred simultaneously throughout data analysis, making the process more interactive than linear. Based on the theoretical domains constructed during phase I of analysis, the researcher constructed analytic vignettes associated with the tensions teachers faced while making career trajectory decisions. Erickson (1986) explained that vignettes “present a clear picture of the interpretive point the author intends” (p.110). The vignette constructed is an abstraction in which certain details are left out while others are sharpened or softened. By combining richness and interpretive perspective, the story becomes a “statement of a theory of organization and meaning of the events described” (Erickson, 1986, p.111), which served as an analytic step. Erickson explained that vignettes illuminate certain social relationships within a setting, so the researcher demonstrated through use of other evidences the thematic nature of the data in order to show validity to a key assertion.

## **Phase III: Generating and Testing Assertions**

The procedure implemented to analyze the vast data in this study was an adaptation of Frederick Erickson's interpretive model, which generates assertions (Erickson, 1986). Erickson explained that (1986) “the basic task of data analysis is to generate assertions that vary in scope and level of inference, largely through induction, and to establish an evidentiary warrant for the assertions one wishes to make”(p. 146). This process begins with the generation of assertions, which occurred throughout the fieldwork. Assertions are claims about the study that varied in both scope and level of assertion. When constructing key assertions, the researcher mapped connections between vignettes and other data forms, including the demographic maps, the

researcher's personal field note journal, and quotations from interviews. The researcher then provided multiple evidences of a key assertion to demonstrate *generalizability within the corpus*.

Erickson (1986) also discussed the importance of searching the data for *falsification*, and openly sharing with the reader the process by which the researcher's preconceived notions were changed. To test the evidentiary warrant for an assertion, the researcher searched the whole data set, looking for disconfirming and confirming evidence, regarding each evidentiary warrant. According to Erickson (1986), if discrepant cases outnumbered fitting cases, then the data does not warrant the assertion (Erickson, 1986). At this point, the researcher returned to the assertion, reworking it, beginning the process through the data again. Through this inductive analysis, the researcher found "key linkages" which served as a foundation for a major assertion. These linkages connected multiple pieces of data that focused on a single phenomenon. Key linkages illuminate generalizations within a case instead of from case to case. Assertions that connected the most data in a meaningful manner were the strongest assertions.

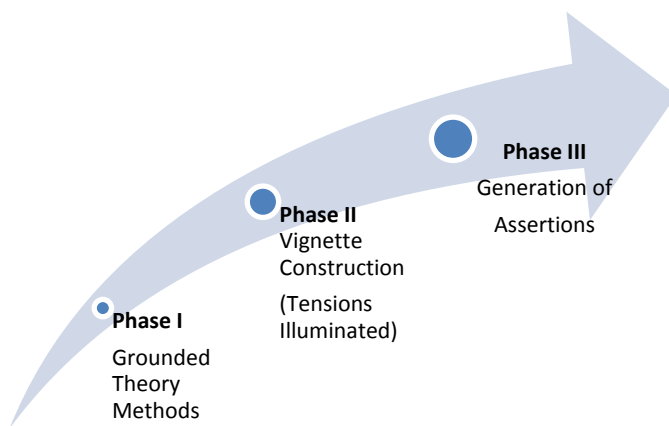


Figure 3.1

*A Picture of the Analysis Process*

### **Ethical Considerations**

Positivistic research methodologies aim to attain the gold standard in research of external and internal validity. Internal validity assumes that a treatment impacts the study that researchers observe while external validity focuses on the generalizability of the research to other populations and contexts. While valuable in certain contexts, this paradigm lacked the depth and differentiation required to address the research questions that guided this study. Instead, this interpretive study cited Winter (2002) who argued that “ validity is not a single, fixed, or universal concept, but rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects” (p.150). In alignment with traditional interpretive research, this study utilized two standards to control the quality of research activity: (1) trustworthiness criteria and (2) authenticity criteria (Lincoln & Guba, 2000). Trustworthiness criteria aligned with the scientifically based methodological criteria of validity and reliability. However, they were consistent with constructionist epistemology which acknowledges the role of the researcher as learner and as an active participant in this knowledge construction. Trustworthiness also acknowledges multiple perspectives, which resonated throughout this study. This study sought to engage rural science teachers in the inquiry process, privileging their perspective and expertise on teaching within a particular context. Placing such importance on the individual teachers’ perspective provided dialogical validity to this study. Dialogic validity (Anderson et. al, 2007) occurred through focus group interviewing in which participants were encouraged to reflect on their school and debate difficult issues within the context. The authenticity criteria which were designed to provide accountability for the rights of all participants to benefit from involvement in the research, aligned with the researcher’s belief

that the inquiry process should enrich the lives of participants, not harm it. Throughout this endeavor, participants were asked to reflect on their teaching, their job, their community. This reflective process encouraged each participant to think through their goals, their aspirations, meeting the authenticity criteria.

### **Summary and Preview of Chapter Four**

Chapter three began with a discussion of the methodological framework that guided this inquiry. The researcher described the components of the interpretive framework that incorporated constructivist grounded theory techniques as well as Erickson's methodology for generating assertions. Next, the researcher explained the political, economic, and educational setting of the study by exploring the history of the region, due to her fundamental focus on science teacher retention in *this place*. The specific data collection methods as well as analysis were then described. Chapter four explores the specific contextual dimensions related to the rural schools studied from the perspective of novice and experienced teachers. The researcher highlights the ways that experienced teachers negotiate tensions that novice teachers felt unable to mitigate.

## Chapter 4

### **Are We Talking About the Same School? How Novice Science and Experienced Homegrown Science Teachers Negotiate Teaching in the Rural, Black Belt Region of Georgia**

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<sup>1</sup>Hodges, G.W., Oliver, J.S & Tippins, D. (2010). *Unpublished dissertation, The University of Georgia.*

## **Are We Talking About the Same School?**

### **How Novice Science and Experienced Homegrown Science Teachers Negotiate Teaching in the Rural, Black Belt Region of Georgia**

*This article, based on an interpretive study of eleven science teachers from the Black Belt region of Georgia, presents context related tensions faced by science teachers as they make career trajectory decisions. Our results highlight the ways in which homegrown status and teaching experience impacted teacher perception of the individual school context. Specifically, the researcher analyzed the ways in which homegrown status and varying levels of teaching experience mediated factors identified by novice science teachers as the most difficult aspects of their job. The factors included multiple preparations, student behavior, and standards and accountability implementation. Analysis indicated that three interacting dimensions impacted each of the teachers' ability to negotiate difficult aspects of teaching science within this particular context: homegrown status, teaching experience, and individual goals for students. Through synergistic exploration of these three domains, the researcher suggests that educational research must examine teacher actions within individual school contexts in order to understand how and why rural science teachers make career trajectory choices.*

### **Introduction**

As Paul Shaker (2004) contends, "Public education tends to be the repository for the best hopes and worst fears of every generation and thus has always been contested and deeply influenced by political and cultural struggles" (p.1445). In the 21st Century, The United States of America continues to strive towards providing a high quality, state funded education to all citizens, which requires multiple tangible and intangible components, including having enough competent, intelligent people that choose teaching as their career. The National Commission on Teaching America's Future (2008) asserted that "teacher retention has become a national crisis" due to excessive teacher turnover (p.21). In science education specifically multiple reports (e.g. NRC, 2002; NAS, 2006) have enumerated the teacher shortages specifically in mathematics and science education. Specifically, the National Academy of Science (2006) published a study entitled *Rising Above the Gathering Storm* which suggested an impending shortage of STEM teachers in excess of 10,000 within the decade. Historically, science, technology, and mathematics fields (STEM) fields have struggled to staff these positions, yet the tenor has

changed, as programs such as President Obama's Educate to Innovate (2009) have simultaneously highlighted the supply and demand issues associated with STEM teachers and the respective impact of the actual teachers in students' learning. President Obama (2010) stated:

The quality of math and science teachers is the most important single factor influencing whether students will succeed or fail in science, technology, engineering and math. Passionate educators with issue expertise can make all the difference, enabling hands-on learning that truly engages students—including girls and underrepresented minorities—and preparing them to tackle the grand challenges of the 21st century such as increasing energy independence, improving people's health, protecting the environment, and strengthening national security. (January, 2010, Introduction section, ¶ 3)

Government officials, educational researchers, parents, and children alike voice concerns over the quality of schooling, often citing teachers as the most influential factor regarding an individual's experience with school. When either teacher quality or teacher demand is examined in relation to demographic trends, including race, socioeconomic status, and school location, staffing issues follow distinct patterns that educational researchers call "hard-to-staff" schools. Hard-to-staff schools are often characterized by children of color from homes with a low socioeconomic status, which are located in urban or rural areas. Why does the United States continue to struggle to staff schools? A primary purpose of this study was to engage in an in-depth exploration of the issue of science teacher retention within a hard-to-staff region of the nation that sociologists refer to as The Black Belt Region of Georgia. Accordingly, the researcher used interpretive, qualitative methodologies in order to gain personal insight into how individual teachers made their personal career trajectory decision. The researcher engaged with the participants over a nine-month period, which began before "contract time." Unlike other jobs

that require two or four weeks notice if an employee wants to change jobs, teachers must decide, and sign a contract, that commits them to a school for a year. If the contract is broken, the state may revoke their teaching certificate. Thus, if a teacher signs his/her contract, it indicates a willingness to stay another year. During data analysis, distinct patterns emerged in relation to how groups of teachers negotiated the contextual issues faced at individual schools. These patterns related to the individual's teaching experience, whether or not the individual was "homegrown", and whether or not the teacher has an explicit social justice agenda underlying their teaching goals.

### **Relevant Literature**

#### **Teacher Retention and Student Characteristics**

A plethora of correlational research that focuses on teacher retention in the United States, has constructed a sketch of who remains in teaching, where 'stayers' like to teach, and why 'leavers' exit the profession (Borman & Dowling, 2006; Guarino, Santibanez, & Daley 2006; Ingersoll, 2006). Multiple researchers (Borman & Dowling, 2008; Scafidi, Sjoquist, & Stinebrickner, 2005) have correlated teacher attrition and migration with large concentrations of minority students, low-performing students, and low-income students based on school demographics and related teacher mobility. Carroll, Reichardt, Guarino, and Mejia (2000) examined teacher attrition patterns, which indicated that increased percentages of African American or Hispanic students available for free or reduced lunch prices positively correlated with teacher attrition. Neild, Useem, Travers, and Lesnik (2003) constructed a longitudinal study of Philadelphia public schools from 1999-2003 and found that the poorest schools experienced the most difficulty retaining and recruiting teachers. Hanushek, Kain, and Rivkin (2004) found similar trends in Texas, highlighting the "migrating" teachers. Migrating teachers in Texas, from

1993-1996 consistently moved from a student population characterized by higher percentages of African American, low-achieving, poor students to schools with White, high achieving, middle class students. Scafidi et. al (2005) correlated teacher mobility in Georgia with student color by examining longitudinal data. The MetLife (2006) Survey of teachers found that in schools where two-thirds of the student enrollment were students of color, only 15% of teachers rated their satisfaction as excellent, compared with 25% of teachers in schools where two-thirds or more of the student population were White. Collectively, researchers have drawn a picture of teacher career trajectory based on Likert-scale questionnaires filled out by teachers who have already left their job (Ingersoll, 2006). There is a growing body of research (Darling-Hammond, 2003; Horng, 2009) aimed at untangling this correlational data in order to gain a more nuanced rendering of the choices teachers make in regards to their career trajectory. Darling Hammond (2002) stated:

The frequently observed flight of teachers from schools serving low-income and minority students is at least in part a function of the degree to which many of those schools also exhibit poor working conditions rather than solely attributable to the characteristics of the students or communities themselves. From a policy perspective, this is good news, since it points to remediable factors-i.e., the availability of materials, class sizes, high-quality leadership, and professional learning opportunities-that can be altered by policy to shape the availability of teachers to all students. (p.64)

Horng (2009) utilized conjoint analysis to disentangle workplace characteristics from student characteristics in relation to teacher attrition. Conjoint analysis enabled the researcher to explore the tradeoffs individuals make in regard to career choice, instead of simply observing the choices made afterward. Horng (2009) asked participants to respond to on-line surveys that

questioned teacher preference on ten domains, which included school facilities, administrative support, class size, commute time, additional salary, resources for students, teacher input on school-wide decisions, student socioeconomic status, student performance, and student ethnicity. Teacher identified school facilities, administrative support, and class size as the three most important factors associated with satisfaction, while citing student SES, student performance, and student ethnicity as the least important. This finding problematized earlier research has utilized only correlational data (Scafidi et. al, 2005) to suggest that student demographics were the most important factor influencing teacher retention. However, Horng (2009) based her research on responses to hypothetical questions, not ‘real life’ situations, which she noted as a limitation of her study.

### **Rural Schools**

Within the context of this study, the researcher defined rural as distinctly different from metropolitan, geographically isolated area with a declining population with few job opportunities. One prevailing definition for rural has escaped scholars (Herzog & Pittman, 2003; Lewis, 2003; Oliver, 2007; Sherwood, 2000) that have focused on small communities for decades which highlights the uniqueness of each rural community. Kathleen Budge (2006) demarcated six common strengths and challenges that spanned rural areas she studied, five of which were salient within the context of this study. Multiple researchers supported her findings, as outlined in Table 4.1

Table 4.1

*Summary of Rural Characteristics and Associated Scholars*

Rural Characteristics	Supporting Research
Low population density and isolation	Beeson & Strange, 2003; Stern, 1994; Oliver, 2007
School and community interdependence	Collins et al., 2001; Herzog & Pittman, 2003; Tippins & Mueller, 2009; Kannapel & DeYoung, 1999; Lane & Dorfman, 1997; Stern, 1994
Oppression as lived experience	Hammer, 2001; Haas & Nachtigal, 1998; Herzog & Pittman, 2003; Nadel & Sagawa, 2002
An “out migration” of young talent	Hammer, 2001; Howley et. al, 1996; Nadel & Sagawa, 2002; Smith, 2003
A salient attachment to place	Haas & Nachtigal, 1998; Howley, et al., 1996; Kemmis, 1990; Porter, 2001

Within this unique context, few scholars (Arnold, 2005; Howley, 2005) have studied issues pertaining to teacher retention. Excluding the Rural Systemic Initiatives in Science, Mathematics, and Technology Education Program, which examined the ‘third wave’ of systemic reform in action in rural settings, there is very little research on science teacher retention in this context (Arnold, 2005; Brownwell et. al, 2005; Ingersoll, 2007).

**The Black Belt region of Georgia.** Within the rural context, was situated in the particular region of the state, which sociologists named the Black Belt Region. This area, also known as the “cotton counties” and the “plantation counties” is considered by many to have a distinct milieu, denoting it as a region, even though it stretches through multiple states. The Black Belt spans from Virginia and Maryland, through the Carolinas and Florida, across Georgia, Alabama, Mississippi, Louisiana and Texas. In Georgia, this region stretches through

79 of Georgia's 159 counties, and its people continue to experience poverty rates consistently higher than the rest of the state and nation (Levernier & White, 1998). Some states, including Alabama, have created commissions that focus solely on this region, infusing resources into the area due to the vast poverty (Black Belt Action Committee, 2010). Although some areas in Georgia prosper educationally and economically, researchers explain that the "new south," popularized by the media does not exist in most rural areas.

Morris (2009) explained that the "new south" encompassed prosperous urban areas, such as Atlanta, Dallas and Houston, while the rural areas, such as the Black Belt region lacked the political, educational and economic infrastructure associated with the more urban areas. This area remains understudied, in spite of a drastically high drop out rate for high school students as well an exceptionally high rate of teacher attrition (Arnold, 2005; Morris, 2009). Scholars (Morris, 2009; Tyson, Darity, & Castellino, 2005) have suggested that rural areas in Georgia provide a unique context for studying African American schooling since 90% of rural African American students attend schools located in the South (Lichter et. al, 2007). This study purposed disentangling the correlational data by conducting a multilayer study of a small group of teachers that work in what many consider the most difficult school to adequately staff: a rural, predominately African American school characterized by a low socioeconomic status.

The following research questions guided this inquiry:

1. *What tensions do science teachers experience regarding career persistence in rural schools?*
  - a. *How are these tensions associated with personal dimensions of rural science teaching?*
  - b. *How are these tensions associated with professional dimensions of rural science teaching?*
  - c. *What tensions do science teachers experience regarding career persistence in rural schools?*

### **Teachers' Understandings of the School Context**

#### **The Context**

Within the Black Belt region of Georgia, the researcher situated this study in four contiguous counties: Five Points, Lorraine, Gray, and Wilson Counties (all names are pseudonyms). Each of the counties experienced a declining population, as businesses and agriculture within the towns have left (Boatright & Bachter, 2006; Census, 2007). Within each county, one high school served as the only public secondary option, thus each school was named after the county. Each of these schools experienced rates of teacher turnover higher than the national average, sometimes surpassing 50% in one year. Poverty rates within the school system surpassed 60%, and most of the students were African American.

Table 4.2

*Specific Demographic Information for Schools in Study*

School Name	School Size	Economically Disadvantaged Students	Student Demographics	Graduation Rate 2009
Five Points PreK-12 Charter School	219	94%	95% African American	68%
Gray County High School	536	77%	70% African American 30% Caucasian	75%
Lorraine County High School	448	59%	65% African American 35% Caucasian	76%
Wilson County High School	478	70%	65% African	89%

**The Participants**

The researcher utilized purposive sampling (Patton, 2002) to recruit participants for this study. The researcher worked within Five Points Charter School (FPCS) for three years working on a teacher quality grant through a land grant institution in the state, which illuminated the need for an in-depth study of science teacher retention within this context. The researcher examined Census Data as well as historical documents to find counties similar to Five Points County educationally, economically, and politically. Table 4.3 shows the demographic information for individuals that chose to participate in the study.

Table 5.3

*Demographic Information Provided by Participants*

Participant Name	School Name	Primary or Secondary Participant	Male or Female	Years Teaching	Cultural Group Identification	Hometown Status	Length of Commute	Certified in Field	Social Justice Agenda	Education Level
Pat	Five Points	Secondary	F	18	Caucasian	No	40 miles	Yes	Yes	Ph.D.
Amy	Five Points	Primary	F	9	African American	Yes	40 miles	Yes	Yes	M Ed
Dexter	Five Points	Primay	M	1	African American	No	40 miles	In Progress	Yes	M Ed
Brittany	Gray	Primary	F	1	Caucasian	No	45 miles	Yes	No	M.S.
Carrie	Gray	Primary	F	33	Caucasian	No	25 miles	Yes	Yes	M Ed
Brady	Lorraine	Primary	M	10	Caucasian	Yes	10 miles	Yes	No	M Ed
Jason	Lorraine	Primary	M	30	Caucasian	Yes	2 miles	Yes	No	M Ed
Hailey	Lorraine	Primary	F	10	Caucasian	No	20 miles	Yes	No	M Ed
Brandon	Lorraine	Secondary	M	8	Caucasian	Yes	35 miles	Adminis- trator	Yes	Ed D*
Jessica	Wilson	Primary	F	6	Caucasian	No	2 miles	Yes	Yes	Ph.D.*
James	Wilson	Primary	M	3	Caucasian	No	2miles	Yes	Yes	MEd*
Mary	Wilson	Secondary	F	8	African American	Yes	4 miles	Yes	Yes	MEd

## **Data Sources**

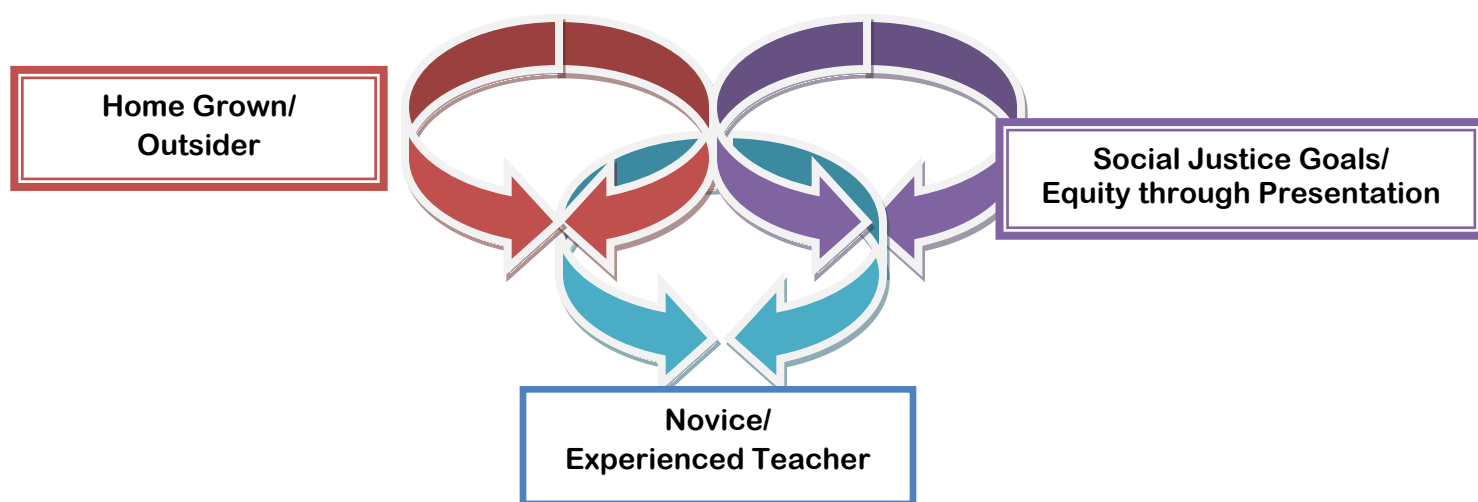
The researcher conducted in-depth life history (Goodson, 2006) and semi-structured (Patton, 2002) interviews for each participant. After completing preliminary coding of the interview data, the researcher constructed focus group protocols aimed at capturing a collective vision of teaching within each of the four schools, completing two iterations of this. Coupling focus groups with the individual life story interview provided participants with the opportunity to explore their individual views as well as those of their peers while providing the researcher with rich data on the dynamics within each particular school. Preliminary coding of the interview transcripts suggested a number of broad tensions from which more detailed codes were subsequently derived. The researcher examined tensions across the eleven cases prioritizing the teacher's interpretations of their school context while they explained their career choice.

## **Data Analysis**

Data analysis occurred in four phases, beginning with implementation of constructivist grounded theory methods (Charmaz, 2006), to organize the vast data set. Specifically, after transcribing each data source and reviewing the reflective memos associated with each data source, the researcher created a code that described each line of the data utilizing Charmaz's 'gerund' technique, which encouraged her to detect processes within the data and stick closely to the individual set of data (Glaser, 1978). After completing all of the data collection for the study as well as initial coding of the data set, the researcher re-entered the data, and focused the coding on the experiences, actions, and interpretations that teachers within and across schools made during the interviews and focus groups. At this the initial code set was collapsed from over 400 codes to 10 theoretical domains with the greatest relevance regarding science teacher retention and attrition.

Next, the researcher adapted Frederick Erickson's interpretive model to generate assertions (Erickson, 1986). Erickson explained (1986) “the basic task of data analysis is to generate assertions that vary in scope and level of inference, largely through induction, and to establish an evidentiary warrant for the assertions one wishes to make.” (p. 146). In order to construct key assertions, connections were mapped between multiple data sets, including the demographic maps, the researcher’s personal field note journal, and quotations from interviews and focus groups. To test the evidentiary warrant for an assertion, the researcher examined the entire data set, looking for disconfirming and confirming evidence, regarding each evidentiary warrant. Through this inductive analysis, “key linkages” were made, each of which served as a foundation for a major assertion.

During Phase Four of data analysis, the researcher reanalyzed three theoretical domains highlighted through the grounded theory analysis: homegrowing teachers, teaching for social justice, and negotiating novice status. During reanalysis, the researcher noticed a continual interlinking of the three domains, which led to the construction of Figure 4.1.



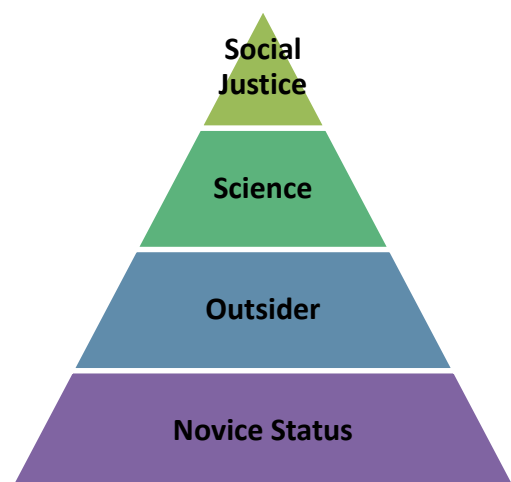
*Figure 4.1 Spheres of Influence* Three main spheres of influence emerged that impacted the way in which individual teachers interpreted their school context.

To elucidate the interconnectivity of three identifiable characteristics that impacted teacher retention in this study, the researcher constructed a visual model (See Figure 4.1). Intentionally circular rather than linear, this figure aims to depict these three teacher characteristics of homegrown, teaching experience, and social justice goals as dialectic. In the following analysis, the researcher explored how each of the aforementioned dimensions either constrained or enlarged the individual participant's interpretation of the specific contextual dimensions that novice science teachers identified as the most difficult to mitigate parts of their job. The researcher completed analysis by constructing a diagram, based on individualized data sets for each participant, in which she prioritized each dimension of Figure 4.1 through reanalyzing the data corpus. The researcher specifically coded the data corpus for contextual dimensions in relation to the individual teacher. The researcher found each teacher prioritized one sphere of influence from the aforementioned figure, which guided their perception of their individual context.

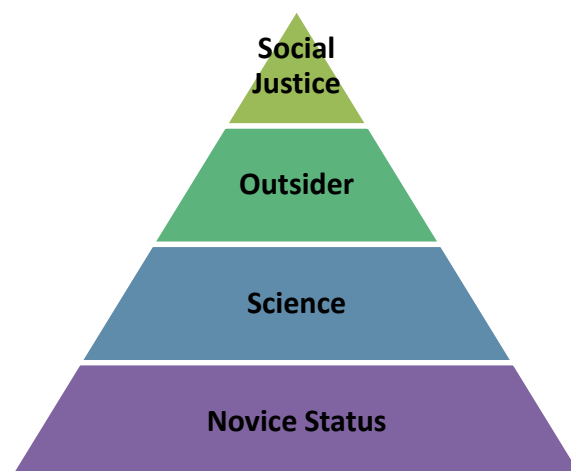
### **Discussion of What was Learned**

This discussion highlights findings associated with each dimension of Figure 4.1. Afterward, the researcher will report the findings in the form of Assertions.

#### **I. Prioritizing Novice Status: It's my First Year and this place is *not like my school***



*Figure 4.2* Dexter's Contextual Understandings



*Figure 4.3* Brittany's Contextual Understandings

**Novices experiencing culture shock! What is wrong with these kids?** Brittany and Dexter began their first teaching assignment during year one of this research study at differing schools. As Brittany and Dexter experienced their first year teaching, they willingly joined the researcher's study, where they openly talked about their teaching experience thus far. Although Brittany and Dexter taught different subjects in two schools, their novice status to the profession overpowered their interpretation of the contextual dimensions of their job, beginning with their interactions with students.

**Introducing Brittany and Dexter.** While completing a master's degree in marine biology, Brittany, a Caucasian 26 year old, taught oceanography to undergraduate students at a research university in the southeast. Brittany explained:

I realized that I loved teaching, I loved watching students understand the complexities of ocean systems. I enjoyed changing what I taught and how I taught it to better teach my students. This is why I decided to add on certification after I completed my master's

thesis. When Gray offered me the job, I was thrilled because they were going to let me teach marine biology. Who gets to do that their first year?” *She began laughing at this point.* Little did I know that at *this* school, you didn’t want to teach an elective because these kids just don’t care. I’ve never seen kids that just lay their heads down and sleep in class. Who does that?” (Interview, August 2009).

Brittany, whose love for teaching science led her to the profession, taught one of the most difficult courses to teach at Gray County High School (GCHS). At GCHS, due to state graduation requirements, the department head constructed a course for Brittany to teach, then told her that no one could fail the course, regardless of what students did or did not do. Oceanography was designed for students that needed one more science elective to fulfill graduation requirements and student behavior indicated that they understood the constraints placed on Brittany, as evidenced by their lack of interest in the course. Her department head Mr. Smith explained: “Look, we’re a small school here and I have teachers that have been here a long time and they get first choice. I know Brittany’s got a tough course assignment, but she’ll figure it out. She’s young, she’s smart; she can handle it.” Mr. Smith, an experienced teacher, knowingly placed Brittany in a role that no other teacher wanted, due to the institutional constraints that encouraged student apathy.

At Five Points Charter School (FPCS) Dexter described his first teaching experience as culture shock after beginning his position as the middle school science teacher. Although raised only thirty miles from Five Points, Dexter, an African American 25 year old, attended a private military school before attending a research university in Georgia. When describing his perception of FPCS, Dexter explained:

You see, I only live thirty miles from here, but it definitely wasn't my first choice. I feel like it's a different world here. Where I come from, the community and the students respect teachers and they want to learn, and that's just not happening here. I went in to teaching because I wanted to impact the lives of African American males, you know, show them a different version of successful, other than the life of a rapper or a professional athlete. But I've got six preparations, I've got the state breathing down my neck watching how I teach and what I teach, and I've got kids that need me but I can't help. Instead, I'm trying so hard to stay above water that I can't even throw them a life raft (Interview, March 2010).

Although Dexter chose teaching due to his own social justice agenda, he felt incapable of enacting this because of the adversity he experienced daily. Dexter remained in contact with his cohort from college, each of whom chose to teach in a more suburban or urban area than Five Points. They have conveyed shock at the copious preparations required of Dexter. While Dexter prepared six courses, his colleagues from his cohort taught two or three courses. Concurrently, Dexter experienced the watchful eye of state officials who checked his lesson plans and observed him, to ensure he was teaching the standards they thought he should be teaching.

**Standards and accountability from the novices' perspective.** Dexter's school (FPCS) failed to make adequate yearly progress last year, which significantly impacted the teaching climate. New teachers were paired with "experts" in their field who worked with them on lesson plans. A second group of auditors from the state began making rounds through FPCS, where teachers were monitored to ensure they were aligning with the state standards. Due to the

researcher's role, which enabled her to observe multiple interactions between teachers and the state "experts," the following excerpt from her field note journal described a typical exchange:

I just watched Mr. Sykes, a coach from the state, **talk at** Melissa for one hour. She broke down in to tears three different times as he told her that she better get it together, she better learn how to make her kids perform. He told her to "get the CRCT prep books out now." That test is still four months away; does he really think this is what the kids need? This is her first year teaching and all he is doing is telling her what she's not doing well. Why can he not help her? I cannot wait for him to leave this room! (Field notes, February 2009)

Just one of many interactions observed by the researcher, it exemplified the general attitude of many of the "helpers" that entered this school. When Alecia, the principal of FPCS, described the purpose of the "helpers" she placed in the school, she explained, "I'm very excited to provide this type of professional development to scaffold our new teachers. What better way could we possibly help mentor new teachers than this?" Had the researcher only spoken to the principal about this intervention/ assistance strategy, her description of the "helpers" would have looked dramatically different than what is described above. Researchers must examine policy implementation in depth prior to making assertions of any level, which will be discussed during the implication portion of this paper. However, understanding the climate in which Dexter teaches illuminated why he described his students' goals in the manner that he chose:

Right now, it's (goals) those standardized tests. I want them to meet or exceed. But my real goal is for them to succeed in life so they can get out of here. There's not much to look forward to here, so if I instruct and teach them to think out of the box, then maybe

they can go somewhere else and not get stuck here. There are more choices becoming a prison guard or driving a truck. They should get exposure. (Interview, August 2009)

At first glance, Dexter's response highlighted a deficit view of the community and students with whom he works. However, the researcher observed and interacted with Dexter on many occasions, where she saw him work with students and teachers, for whom he always conveyed mutual respect and admiration. Dexter, who chose to teach in order to influence African American males has been unable to build relationships with other teachers, students, and community members. Dexter, an African American male from a very rural town considered himself an outsider at FPCS, as he lacked to time to interact with locals. After working all day, Dexter commuted forty-five minutes home, on the nights he did not attend graduate school.

At GCHS, Brittany taught three different courses on a four block schedule, none of which had an accompanying end of course test (EOCT). Brittany, a hardworking professional with an exceptionally rich science background, described the standards that guided the courses she taught:

So, the extent that I use the standards is that I have to put them on my lesson plans and on the board, because "they" tell me to, but when I read through them, they don't give me enough information to tell me what I need my students to really learn. Do my students need to memorize this stuff or what? They say things like they need to understand these broad ideas, but there are just so many different ways that you could go about doing that that I really don't know how I should even start and no one helps me. So I don't know how much they should learn or how much they should remember, so I just try to think about what I did when I was in chemistry and do that, except, I don't even remember that much. Then, when I look at our text book, I think it's terrible, so I'm always trying to

find stuff on the internet, and other places. Now, as for the oceanography standards, I don't like them at all! OK-just one example, thermohaline circulation, now this is a fundamental concept in oceanography, well, it's not on the standards or in their book. HOW?" (Interview, February 2009)

In spite of completing a fully credentialed certification program, when pushed out of her comfort zone, Brittany knowingly defaulted to the ways in which she was taught in her middle class, traditional school system. Moreover, since Brittany's current school system required standard alignment on the board and in her lesson plans, she followed the rules, even when she knew better, as evidenced by her discussion of thermohaline circulation. Brittany, a highly educated, hardworking teacher felt constrained to teach standards that she felt incompetent to interpret. When asked to describe her goals for her students, Brittany again returned to her high school experience:

My biggest issue with this place is that education is not valued here like it was in my county or other systems. I have a kid in my oceanography class that doesn't "need" it for graduation, so instead of you know, doing the work and doing the activities and being interested in it, he just sits there and takes zeros on everything. Now, he made a 98 in geology last semester, but since he doesn't need it, he doesn't bother. And that's just the general attitude. The parents certainly don't seem to care whether their kids drop out and get a GED. They think that's OK. Some of them just stop coming all together. I don't even know if they end up getting a GED-I'm just surprised at the prevalence of this attitude. I mean, I knew, coming to Gray, with its reputation, well, I wasn't expecting a bunch of little Einstein's running around the room where they're all driven and wanting to go to Harvard, but I still can't really wrap my brain around the fact that they really

don't care about there grade or their GPA. They marginally care if they graduate and that just blows my mind. I was NEVER like that and I NEVER knew anybody like that in high school. I mean, I'm telling them that this lab is worth a test grade and they still don't do it! (Interview, February, 2009)

Similar to Dexter's explanation of goals for his students, this excerpt highlighted Brittany's deficit view of her students and the community. Neither Dexter nor Brittany were prepared to teach the students they were assigned, in spite of completing certification programs. The constraints of their school system, which required them to prepare multiple courses, many of which they were not prepared to teach, placed them in an impossible position. Collectively, both FPHS and GCHS have experienced improvements in test scores over the last five years, but the students that Dexter and Brittany taught did not respond to school in the way they expected them to respond.

Both Brittany and Dexter generally enjoyed "playing the game of school" or they would not have chosen teaching as their profession. Thus, Brittany, whose love for teaching and learning led her into the classroom, failed to realize her goal of teaching students innovative, high level science. Dexter, who wanted to change the lives of poor African American males, was unable to implement any of the extracurricular activities he envisioned because his school system overloaded him with multiple preparations. Neither Brittany nor Dexter's university experiences prepared them to teach amid the intergenerational poverty where their students were often the most highly educated people in their families. Rebecca Anhorn described the teaching profession as "the profession that eats in young" (2008, p. 15), which both Brittany and Dexter's stories conveyed.

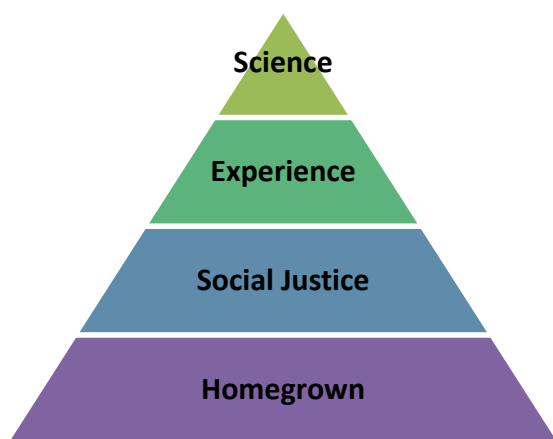
Both FPCS and GCHS failed to provide the support that Brittany and Dexter needed to feel successful in their first teaching position. In Brittany's case, the administrator knowingly placed her in a defensive position with her students, which left her powerless to enact the innovative pedagogy she desired to utilize. After months of repeated failures, Brittany gave up on teaching the students at GCHS and instead transitioned to survival mode. This mode led her to return to lecturing and note-taking in lieu of innovate web quests and research projects. Brittany also began to believe that the students at GCHS did not value education. Similarly, Dexter, overwhelmed and alienated, decided Five Points lacked the academic rigor he desired in a school. How might this story have ended if these two new teachers were supported by the administration with actions and words? As these examples suggest, Brittany and Dexter's deficit views of students may have been influenced, in part, by the administration's failure to provide them with meaningful personal and professional support.

**Future plans.** When the researcher first interviewed Brittany in February of 2009, she planned to begin a science club and stay at Gray for at least five years. Just one year later, Brittany declared, "I will get out of this school; there is no possible way that I will stay in this place another year. I'll wait tables before I do that. I'm getting a job in the Atlanta because I want to keep teaching and I know they must do it better somewhere else" (February, 2010). Similarly, Dexter explained, "I'm just putting my time in here and I'm going to keep my resume out there in Atlanta. This is no place to raise a family and I would not ever let my kids (future, he has none right now) go here. Although disenchanted with this *place*, both novice teachers plan to continue teaching, which begs the question, how will these two schools, each of which are very difficult to staff, replace the lost teachers? For Brittany and Dexter, the question remains, when they enter a new school, will they find it to be different or will they experience the same issues at

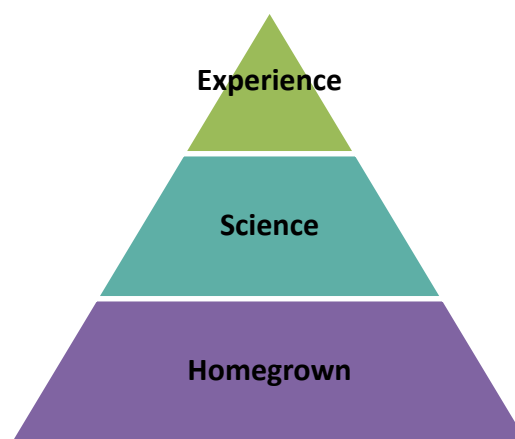
a new location? The next sections highlight findings from the same two schools. However, each of the teachers has multiple years of experience. *Are we talking about the same schools?*

## II. Homegrowing Teachers: Understanding *my* School, *my* People

In an effort to diminish consequences of the teacher shortage, many rural school districts have embraced the concept of “growing your own” as suggested by researchers such as Lemke (1994), Hutchison and Sundin (1999), and Darling-Hammond (2003). Although research is essentially nonexistent regarding the actual effects, the “grow your own” strategy assumes that by placing a member of the community in a teaching role, the teacher will experience inherent motivation and job satisfaction (Huysman, 2008). Within this study, five of the 11 participants were “homegrown.” The research indicated that homegrown status impacted teacher retention both positively and negatively, as evidenced by the stories of Amy, Mary, and Jason.



*Figure 4.4* Mary and Amy’s Contextual Understandings



*Figure 4.5* Jason’s Contextual Understandings

**A brief history of the participants.** The researcher highlighted the careers of Mary, Amy, and Jason, since they currently teach with Brittany and Dexter. Mary, Amy, and Jason each attended the schools where they currently teach. During data analysis, the researcher noted multiple similarities between Mary and Amy, as evidenced by their similar understandings of dimensions that impacted their understanding of the individual school context. Mary, a fifty-eight year old African American woman experienced integration at Gray County High School (GCHS). She returned home after working for 25 years in Philadelphia, where she directed product development for a nationally recognized chemical company. There, she utilized her dual master's degree in biology and chemistry earned at an All Black College in Georgia. During Mary's first year of teaching, she participated in the Teacher Alternative Preparation Program (TAPP) where she added on her certification. Amy, a thirty-two year old African American woman attended GCHS, although she now teaches at FPCS, due to the shared past between the schools. From desegregation until 2001, all high school students were bussed from FPCH to GCHS where they dropped out at rates surpassing 50%. Although Amy "never planned to teach," she realized it was her calling as soon as she began teaching on provision with only a Biology degree. Since then, she completed a master's degree in science education and a specialist degree in administration. Finally, Jason, a Caucasian, fifty year old male, attended Gray County High School (GCHS). With one parent in the army, Jason attended GCHS for four years, the longest amount of time he ever spent in one location, a place he now says he will never leave. He graduated from a state university, and then began teaching in a near-by town, when Gray County did not hire him. Eighteen years ago, Jason entered Gray County Middle School, after teaching in three surrounding counties, where he taught for one year before losing his position. Jason began teaching in another neighboring county where he stayed for three years before Gray

County, unable to hire anyone else, acquiesced, rehiring him. Jason, a self-professed “homebody,” loves his home, his town, and wants to teach science here “until he dies.” During data analysis, the theme *understandings of school contexts* dramatically varied between novices and experienced, homegrown teachers.

**Homegrown perspectives on standards and accountability.** While Dexter and Brittany found standards and accountability both overbearing and ill conceived, the homegrown teachers interpreted them differently. For example, when discussing the difficulties of teaching at FCHS, Amy never mentioned standards and accountability. Instead, Amy, who taught every high school science course offered at FCHS explained, “teaching all the preparations every day is tough. I have labs going, kids doing activities, and grading, it’s difficult when you have 13 preparations a year. *She laughs*, “Now, I want you to imagine how difficult it is to do group work with three kids in the class.” Only when the researcher probed, specifically asking Amy about standards and accountability, did she mention them. She explained:

The standards DRIVE the curriculum because it’s what they have to know, so it’s what I teach. Like right now, since my chemistry class is done, I get to teach the stuff I want to teach that I know they need. But, since the standards drive those tests, I teach that first. So, there is less to teach based on the GPSs, so I go back afterward and teach them what they need to know. (Interview, April 2009)

Amy began her teaching in the middle school eight years ago. In 2001, less than 35% of the FPCS high school students passed the Georgia High School Graduation Test (GHS GT) in science on their first attempt. Amy stayed with her first group of middle school students, transitioning to the high school with the same students, where they achieved over a 90% pass rate in 2008 and 2009. Amy has successfully taught her students how to pass the GHS GT that

once kept over 50% of FPCS students from graduating high school. Amy then spends the remainder of the year delving into topics that she believes students need for lifelong literacy.

Similarly, Mary explained that her friend, the former principal of GCHS, “called me home because our kids could not pass that GHSGT in science, to the extent that less than 50% of our kids were getting diplomas.” Mary immediately implemented afterschool tutoring for the graduation test, began educating the community on the importance of tests, and built a new science department hiring only “teachers that teach.” She explained:

I do not love the standards, but I am willing to teach them because I want my kids to be able to compete. You ask why our pass rate has increased from under 50% to 96%, it is because we teach. Every one of my teachers teaches. We don’t allow kids to sleep instead of work. We don’t allow them to skip class or not do their homework. And guess what? They respond, they work, they learn. These are smart children if we give them a chance.  
(Interview, August 2009)

Amy and Mary openly acknowledged the problems associated with the current standards, yet they successfully navigated the constraints that the novice teachers failed to overcome. Unlike Dexter and Brittany who indicated that they were powerless to change anything, both Mary and Amy self identified as the change agent in their individual classrooms realizing their overarching social justice goals daily. However, Jason showcased a completely different thought process when he discussed standards and accountability:

I just don’t take it too seriously because the people making up those standards have probably only taught three years. These people go and teach for three years, then they get a piece of paper from some college where they do research on three people, then they tell me what to do. Education is messed up when you get promoted and make decisions based

on a piece of paper. Sure, I'll tweak what I teach and call it what they want me to call it, but that's it. It's up to those kids to learn it. (Interview, April 2009)

Jason continued to explain his skepticism of the educational system, but he refused to challenge it. Instead, he only lectured, using the same notebooks he constructed years ago, where he required students to copy overheads. Since the laboratory is in ill repair, he has not taught a lab in eight years! However, since his GCHST scores surpassed the state averages, he continues, unquestioned, and the school remains "off the radar." As evidenced, experienced, homegrown teachers interpreted the standards very differently than the novice teachers within this study. The researcher found that homegrown teachers' views of the students and the community undergirded their ability to teach within the particular school context.

**Homegrown perspective on student learning and educative goals.** When asked, both Dexter and Brittany conveyed deficit views of the students they currently teach, whereas Amy and Mary described the same group of students as "highly capable" and "excited about learning." Moreover, Amy and Mary have each worked to change departments into places where students succeed. Amy recalled the difficulties she faced with student discipline when FCHS first opened:

We had so many problems with discipline from the kids that Gray had labeled "bad kids." And some of them did have terrible behavior, but the administration told us we had to learn how to discipline our kids within our rooms, and not write them up for every little thing. We were told we had to learn how to teach all children. This was powerful because we learned to take responsibility for our kids in our classroom. Now, a lot of teachers hated it, but we have turned it around. (Interview May, 2009)

Similarly, Mary described her first experience with discipline issues at Wilson:

We just don't have discipline issues here. Our kids know what they have to do and they do it. No, when a kids doesn't do his homework, he's serving a detention because it directly impacts those failing classes and not being successful-we're just not going to let kids choose to check out of school. I think we often forget that these are kids we are talking about. When a teacher chooses to let a fourteen year old child check out of her class, she is harming that child. I can't name you a whole bunch of special things we do, we just tell them, you go in the room, you close the door and you TEACH. And if there's anything that you're doing that's hurting a child, you stop. And we don't lean to any race, you don't lean to any gender, but every child must be able to be successful in your room and that's our focus. And we will NOT do anything to, to hurt any segment of children and I think when you have that motivation that they need to be successful then it happens.

I'm fortunate that there's a department that all feels that way. (Interview, October 2009)

Both Amy and Mary conveyed their belief in the importance of the teacher in relation to student learning. Instead of talking about what the students may lack, in terms of knowledge about school protocols, these teachers conveyed ownership. Amy and Mary took complete responsibility for learning and discipline within their classrooms as evidenced in how they taught, what they taught, and how the students responded. When Amy and Mary wrote students up, they both explained it as a personal failure. Amy stated:

Well, these are MY people. I grew up here. I know them and they know me. So even though I love teaching and I love being among the people, this is me giving back to my people. I know their struggles and I know what they have endured because I know them personally. I grew up with their mamas, aunties and cousins, so when I have kids make

harmful decisions, like skipping class or cursing at each other, I have failed. What good does it do these kids to sit at home because I had them suspended? (Interview, July 2009)

Both Mary and Amy were first generation college students in their families. Each has experienced the transformative power of education in their personal lives, which they highlighted throughout their narratives. They both aspired to provide this educational experience for every child that attended their schools. Both Amy and Mary explained that each child deserved this. As Mary explained, “my parents marched for me to have this opportunity; the least I can do is choose to teach all my students.” When the researcher explored goals for students with Jason, he separated the them into two distinct groups.

So, about 80% of 9th graders think they're going to college and they'll tell you they're gonna be a pediatrician or a psychologist, even though they don't know what those jobs are, somebody has just told them they should go to college. Some go to the military and a lot just go to work. A lot of them end up right here working or in technical school, but you know, you can't tell them in 9th grade that that's probably where their interest is and that they can make good money with a trade. Oh no, we have to tell them college, college, college, even if they can't do algebra and are not capable of attending college. So, we do have a big variety-a top layer that will go to college and succeed, then a whole group that will end up right here trying to find a job, even though they can't do algebra. (Interview, May 2009)

Similarly, Jason's ideas on discipline and pedagogy aligned with his dichotomized beliefs pertaining to student ability:

My job is to prepare kids for college, so I lecture, I test, and I tell them that it is *their* responsibility to learn what I teach. It offends me when policymakers or other teachers

continue to blame me for kids not learning. They have a choice to make and guess what, the ones going to college make the right choice. The ones that we all know are going to drop out, they don't. But I give each kid the same opportunity, if they choose to act like idiots, I write them up and they're gone. That is *not* my job. (Interview, May 2009)

Collectively, Jason's chosen methods for teaching and disciplining within GCHS highlighted his deficit views of the students he taught, which problematized the notions of homegrowing teachers. Correlational research would demarcate Jason a story of success in teacher retention, which this study problematized by unpeeling more layers of the problem. When the researcher interviewed Brandon, the principal of LCHS, Brandon explained why his predecessor rehired Jason:

Fifteen years ago, we got rid of Jason, then we were unable to find *anyone* that would take a job here. They actually ended up getting an assistant principal at the time to go back into the classroom because they could find another administrator. So, do I think he's the best candidate for the job? No. But, he knows his content, he's here every day and he stays. If I don't keep him, I don't know who I could find to replace him and our kids deserve to have certified teachers who know their content. So, no, he's not the best, but we've had so much worse work in our schools. (Interview, August 2009)

### **Conclusions**

This study found that science teacher career trajectory was not fully explained by the correlational research that often links race, socioeconomic status, and context to teacher retention. Rather, teachers made career trajectory decisions based on a myriad of interconnected dimensions impacting their personal and professional lives within a given context, or school.

The purpose of this study was to explore science teacher retention from the teacher's perspective, with the goal of providing more than a simple snapshot of a teacher's choice at one particular moment in time. Only after spending months within the schools while simultaneously researching the history of each of the schools, was the researcher able to make any sense of the way in which both novice and experienced, homegrown teachers understood their school contexts. Thus, the researcher constructed the following assertions which she explicitly nests within the context of the studied schools.

**Assertion I: Novice teachers construct deficit views of students, schools, and communities when they feel isolated and overwhelmed.**

Sargent (2003) explained that novice teachers need a supportive community where there is "structure, support, consistency and the freedom to take risks" (Sargent, p. 45). Both Dexter and Brittany began teaching over forty minutes from their homes. Neither has made connections with other teachers or community members. Moreover, neither has had success when they have tried to get parents to come to the school. Thus, each novice teacher has constructed a view of the community based on brief interactions. Isolation is a primary reason cited for novice teacher attrition (Heller, 2004). Heller discussed loneliness within the teaching profession as well as within the actual school, in relation to policies and school culture, which was amplified for Dexter and Brittany, who self identified as outsiders to the school and community. Newer teachers that taught at the remaining two schools within this study lived within the county where they taught while Dexter and Brittany have already decided that they will not move to the area or continue teaching there.

**Assertion II: Experienced teachers continue to make novice teachers attempt the most difficult job in the department, keeping the easier jobs for themselves.**

When analyzing the course assignments at each of the schools in this study, three of the four schools used seniority to determine which teacher taught individual courses. Three of the four department heads explained this as accommodating the more experienced teachers. However, Jason, the experienced teacher discussed above, served as the department head at his school and explained, “I always change up who teaches what so that none of us get burned out.” Researchers Andrews and Quinn (2004) explained that beginning teachers complete the same job as experienced teachers from day one. In these rural settings, novice teachers were expected to complete jobs that most teachers would find impossible. Moreover, Brittany was purposefully given the most difficult classes to teach.

**Assertion III: Advocating for counties to “grow their own” may perpetuate myths of rurality and rural people.**

As evidenced by the stark differences noted in this exploration of homegrown teachers, researchers must bound their assertions. Although Mary and Amy have successfully implemented multiple programs that have led to students graduating in their respective schools, Jason persists only because of his homegrown status. When researchers group people and suggest that people inherently have a set of skills, such as those highlighted in “growing your own” literature, both the individuals within the rural town and the prospective teachers lose their individual identity. Studies must delve deeply into people, rather than utilizing sociotypes or stereotypes to validate or invalidate teachers. Growing your own also complicated firing a teacher who was connected throughout the community, as evidenced by Lorraine’s rehiring of Brandon.

**Overarching Assertion: Homegrown status, teaching experience, and personal goals for teaching intersect, collectively informing science teacher retention.**

This overarching assertion was generated through multiple readings and analysis of the data corpus pertaining to this qualitative investigation of the teachers at Five Points Charter School and Gray County High School. Williams explained that “satisfying relationships and a sense of community are inextricably intertwined with good teaching and job satisfaction” (2003, p. 72), which highlights a positive dimension of growing your own teachers. Liu et. al (2006) asserted, “New teachers yearn for professional colleagues who can help them acclimate to their school’s unique culture, help them solve the complicated, daily dilemmas of classroom teaching and guide their ongoing learning (2006, p.45). This study suggests that an understanding of the personal teaching goals of novice teachers may enable school systems to appropriately scaffold new employees, helping them find satisfaction during the difficult transition into teaching.

### **Recommendations**

Teachers, policymakers, community members, and parents must understand the difficulty of teaching. It is an impossible task to completely prepare a person for teaching before they enter their individual classroom. Somehow, teacher educators and school systems must find ways to collaborate in order to scaffold novice teachers. Moreover, school systems must alter the job description of novice teachers. The number of preparations, the number of courses, and the amount of students novice teachers teach should look different from that of an experienced teacher. There is no other profession that expects the same results from a novice as the results produced by veterans with thirty years of experience. In commercial construction, architects first draw small, simple buildings, gradually adding rich detail and increasing the structure size. In national sales, managers begin with one account, adding others as their expertise and confidence increase. Education must find ways to mitigate novice teachers’ first years within the profession.

Experienced teachers must step up and own the role of teaching for change. In 1995, Blunck, Crandall, Dunkel, Jeffries, Varella, and Yager stated, “Science education in rural settings may be able to provide the most conclusive and useful examples of successful reforms due to the ability of personal experiences to drive knowledge exploration in real life contexts” (p.90). As evidenced by the success of Amy and Mary, rural schools are a unique context for studying teacher impact on student learning due to the ease with which an individual’s impact is seen. Few students leave these schools, and new students are an even greater rarity. Instead of excluding rural schools from the educational research agenda, the researcher suggests that rural schools provide a compelling place to study the impact of policies, such as accountability and reform. However, before implementing far-reaching reform or making sweeping generalities, researchers and policymakers must first understand the individual schools. Within science teacher retention literature, research that fails to acknowledge the complexity of people and the complexity of the decision-making process will continue to provide insufficient, overgeneralized, useless information for schools, districts, states, and the nation.

### **Summary and Preview**

Chapter four discussed the different ways that participants in the study negotiated context related tensions they experienced. Three main dimensions, length of career, attachment to the town, and their teaching philosophy emerged as the most salient components impacting their job satisfaction. Chapter five highlights findings from Wilson County High School, using the stories of the teachers to convey how highly qualified science teachers became dissatisfied with their job.

## Chapter 5

### **Science Teacher Retention in the Rural, Black Belt Region of Georgia: Examining a Link between Deprofessionalization and Dissatisfaction for Teachers**

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<sup>1</sup>Hodges, G.W., Oliver, J.S & Tippins, D. (2010). *Unpublished dissertation, The University of Georgia.*

## **Science Teacher Retention in the Rural, Black Belt Region of Georgia: Examining a Link between Deprofessionalization and Dissatisfaction for Teachers**

*Abstract: This article, based on an interpretive study of 10 science teachers from the rural, Black Belt region of Georgia, presents the personal, professional, and contextual tensions they faced as they made their career trajectory decisions. Although these teachers worked at schools that were generally considered “difficult-to-staff”, due to factors such as location, socioeconomics, and demographics, one school became stable and high achieving, a place where teachers stayed and students excelled. This study reached beyond reporting the general demographic trend data and explored the individual teachers at Wilson County High School. Wilson boasted an 89% graduation rate in 2009, which steadily increased from 50% in 2001. This findings from this study offer a more nuanced rendering of why these teachers stayed, how they perceived their job, as well as what plans they made regarding future career choice. The results highlight the impact of contextual dimensions within the professional lives of teachers at Wilson High School that affected the career trajectory of the science teachers. These dedicated, successful educators who regarded their career as an altruistic endeavor felt that their vision of the teaching profession and changing professional responsibilities as teachers were in heightened conflict. Due to deprofessionalization as evidenced by lack of input into important school related matters, resource mismanagements, and standards and accountability implementation, two experienced teachers are now considering leaving. Implications of this research are twofold, and focus on the need to address the current reform emphasis on standardized assessment as well as suggestions for improving preservice education. At the school and district level, WCHS displays how deprofessionalization, over time, may alter the career trajectory of the most dedicated teachers. Regardless of mentoring, collegiality, and academic success, the teachers at WCHS felt compelled to consider career alternatives that would again take them out of teaching, due to changes in their job. WCHS offers an example of the direction that other teachers may take, if the profession continues to morph into one where teachers lack autonomy and independence.*

### **Introduction**

Policymakers, economists, and educational researchers have highlighted the importance of recruiting and retaining highly qualified teachers due to the pivotal role that teachers play in the learning process. Multiple scholars (Darling-Hammond, 2003; Ingersoll, 2009) have indicated that rural schools generally experienced higher rates of turnover as well as more

difficulty in the recruitment process. For science teachers specifically, multiple reports, including *Before It's Too Late*, from the Glenn Commission on Mathematics and Science Teaching for the 21st Century, and *Rising above the Gathering Storm* (2006) questioned the quality of science teaching that students are receiving in the public school setting. Each report called for staffing all classrooms with highly qualified teachers. Compounding the challenge of staffing all science classrooms with highly qualified teachers is the fact that teacher turnover in science classrooms continues to rise, as fifty percent of science teachers leave the profession within the first five years of teaching (Ingersoll, 2006). Perhaps, most importantly, compelling evidence, collected over a wide range of time, suggests that teacher turnover negatively influences student achievement (Darling-Hammond, 2006; Grissmer & Kirby, 1987; Ingersoll, 2001).

Research has documented the tremendous impact of teachers on the learning environment, but findings also have suggested that teacher persistence in the teaching career at a given school improves student learning at that school. Studies of teacher impact, or “effect,” have linked teaching with student achievement gains (Mendro, Jordan, Gomez, Anderson, & Bembry, 1998; Sanders & Rivers, 1996; Rivkin, Hanushek & Kain, 2005; Wright, Horn & Sanders, 1997). Researchers (McCaffrey, Koretz, Lockwood, & Hamilton, 2003; Rivkin et al., 2005; Skolnik, Hikawa, Suttorp, Lockwood, Stecher, & Bohrnstedt, 2002) have illuminated the finding that teacher effectiveness improves with experience, increasing from the early years of a teacher’s career. These findings combine to suggest that there is a synergistic effect resulting from the growth of teachers’ effectiveness and their years at a specific school. Thus, schools with high turnover rates may continually short change students learning, less experienced teachers continually teach students, year to year. Although multiple scholars (Ingersoll, 2010; Murnane,

1988) have dedicated their career to understanding teacher attrition, retention, and migration, researchers continually find the issue of turnover difficult to explain (Boe et. al, 2008; Horng, 2009), due to the nature of the data collected and the differences found within schools and between individuals. Valuable correlational research has sketched an outline of the typical career trajectory pattern followed by science teachers.

Science teacher educators understand that new science teachers are the most likely to leave the teaching profession. We also understand that teachers who work in urban or rural settings that have a high percentage of poor students and ethnically diverse students are most likely to leave (Horng, 2009). What we do not understand is *why* science teachers are compelled to make the decisions they make. A primary purpose of this study was to engage in an in-depth exploration of the issue of science teacher retention in the Black Belt Region of Georgia. The researcher used interpretive, qualitative methodologies to reach beyond the general characteristics, or *factors*, that prior research (e.g. Horng, 2009; Ingersoll, 2007) correlated with teacher attrition. Instead, the researcher entered four schools, where she built relationships with teachers over a nine-month period, and discovered who those teachers are, as well as the personal, professional, and contextual tensions each individual faced while deciding whether to go or stay. For educators, contract time (the period of time in the spring when a teacher is offered a contract for the following school year) involves deciding whether to teach in the school the next year. Unlike other professions that require a two-week notice to change jobs, teachers sign a contract that, if broken, can result in the revocation of their teaching license. Due to the weight carried by the potential for contract revocation, teachers who have signed their contracts typically stay for the year. Among the four schools studied, Wilson County High School emerged as an exemplar whose science department retained quality teachers and whose students

surpassed most other school districts within the state on standardized tests scores as well as graduation rates. The research reported here delves into the tensions affecting the Wilson County science teachers. This segment of the research took on great significance when it became clear over the period of the study that the Wilson County High School teachers, once part of a stable, successful department, were considering leaving the profession.

The theoretical framework for the data analysis involved application of Feldman's *teaching as a way of being* (Feldman, 1997) perspective, which focuses on the unique ways in which individuals made decisions within a particular time and place. Ultimately, the reasons that the WCHS teachers began to consider leaving the profession resulted from tensions that schools administrators as well as policymakers could change. Thus, although this particular school's science department may not persist as a collective teaching unit, there is some hope within this narrative for improving retention in other difficult-to-staff schools.

## **Literature Review**

### **Teacher Retention Literature**

Teacher research has produced a vast body of knowledge about the various characteristics that impact teacher retention on a global scale-particularly those aimed at *teaching experience* (Hanushek, 2002, Ingersoll, 2001, Murnane & Olson, 1989), *gender* (Boyd et al., 2005; Ingersoll, 2001), *teacher quality* (Boyd, Lankford, Loeb & Wyckoff, 2005; Hanushek, 2002; Ingersoll, 2006), *subject specialty* (Boe, Bobbit, & Cook, 1997; Grissmer & Kirby, 1992; Ingersoll, 2001), and *school characteristics* (Boyd et al., 2005; Hanushek, 2002; Theobald, 1990). School characteristics studied have included *matched teacher-student racial composition* (Boyd et al., 2005; Hanushek, 2002; Scafidi, Sjoquist, & Stinebrickner, 2003), measures of

*poverty rates* (Clotfelter, Ladd, Vigdor, & Diaz, 2004), *characteristics of school administrations* (Blasé and Blasé, 2004; Useem, 2002) and *teaching assignment* (Johnson & Birkeland, 2003).

These findings have produced a general sketch of the individuals who left the teaching profession based on survey data, exit interviews, and occasional interviews. In response to political documents such as *No Child Left Behind* (2002) and *The Gathering Storm* (2006), science teacher attrition has emerged from among the more general study of teacher retention to become a more studied area during the 21<sup>st</sup> century.

### **Science Teacher Retention Literature**

In 2009, Richard Ingersoll utilized the data collected by the National Center for Education Statistics Schools from 1999-2004 to reexamine (Ingersoll, 2001, 2003) the notion of a problematic shortage of science teachers. Ingersoll (2009) determined that there were plenty of qualified science teachers; there were not enough qualified teachers *willing* to teach. For science teachers specifically, in 1999, over 223,000 science teachers were teaching in U.S. schools; of those, 39,979 did not return to their teaching the next year. Within the 39,979 “leavers”, over-18,000 migrated to different schools, while the remaining 21,627 left the profession entirely. Only 4,000 of the leavers retired from the profession, which left over 17,000 teachers leaving the profession for reasons other than retirement. Approximately 25% of the science teachers that left cited dissatisfaction with the profession as the reason they left teaching. The reasons cited for dissatisfaction included inadequate planning time, a lack of supplies, little teacher input in decision-making and large class sizes. Ingersoll (2009) showed that universities and alternative certification programs produced enough science teachers to meet the demand due to teacher retirement and student enrollment increases. However, at the end of the 2001 school year, more the science teachers that left surpassed those that began teaching by 30% (Ingersoll, 2009).

Therefore, Ingersoll (2009) asserted that there were plenty of certified science teachers, but there were not enough people willing to teach. In the 21<sup>st</sup> century, researchers have begun to focus on science teacher retention, including the way in which induction into the teaching profession occurs for new science teachers.

**Teacher induction research.** Many beginning teachers have reported that their first teaching experience was one of isolation, of being ‘thrown in at the deep end’, which rarely included satisfactory advice, mentoring, or supervision to help them cope” with the challenges faced while teaching (Lovat & McKenzie, 2003). Khamis (2000) reported that this isolation led to stress, self-doubt, and dissatisfaction with the teaching profession, which contributed to decreased teacher effectiveness. Skilbeck and Connell (2005) suggested that initial teaching experiences significantly impact teacher attrition rates as well as long term commitment to the profession.

For science teachers specifically, literature reviews have highlighted the importance of mentoring and induction programs improving new teachers’ first experience with teaching, when such programs match novice teachers with experienced teachers within the same school context, teaching similar content (Koballa & Bradbury, 2009). Research has indicated that the pedagogical content knowledge or PCK (Grossman, 1990; Shulman, 1986) of beginning teachers lacked the connectivity of that found in more experienced teachers (Gold, 1996). This finding indicated that by partnering experienced teachers with novice teachers, the learning environment for students of novice teachers would improve (Luft, 2003; Friedrichsen, Lankford, Brown, Pareja, Volkmann, & Abell, 2007). Researchers (Luft, 2003; Wojnowski, Bellamy, & Cooke, 2003) found that matching qualified mentors with new teachers combats teacher attrition while concurrently improving pedagogical content knowledge of novices. Similarly, Friedrichsen et al.

(2007) used a case study design of 18 beginning teachers' perceptions of support during their induction year of teaching mathematics or science. Using a grounded theory approach, these researchers found that novices provided with mentor teachers, as well as time to build relationships with other novice teachers were more likely to persist in their careers. Wojnowski et. al (2003), in their comprehensive review of the literature on mentoring, induction, and the retention of science teachers, identified improved relations between novice teachers and their colleagues through induction. However, The National Science Board (2008) found that only 67% of science teachers received induction support. Science teachers located in schools characterized by high minority enrollment (>45%) and high poverty (>50%) experienced mentoring at rates of lower than 35% (National Science Board, 2008). Collectively, this literature suggests that the collegiality fostered through mentoring and induction programs may improve the teaching as well as retention rates of science teachers.

**Science teachers as professionals.** Sheila Tobias (2009) asserted that a lack of professional working conditions created the miasma for science teachers' attrition. Tobias (2009) analyzed Ingersoll's (2001) work, where she explored the complex issues of science teacher retention. She first explored the *Teacher Follow-up Survey* (TFS) and found that of the science teachers who left the profession 30% left teaching to pursue another career. An additional twenty percent of these teachers left due to dissatisfaction with their school or current teaching assignments. Using her analysis of this data as well as additional qualitative analysis, Tobias argued that changes to the profession that encourage teacher autonomy and curricular control would encourage science teacher retention. Some aspects of Byrd's (2007) findings supported Tobias' contention. Byrd studied science teachers from South Carolina who left the profession by inquiring into the factors that could cause them to return. The former teachers in Byrd's study

indicated that (a) increased salary, (b) increased input into school leadership, and (c) improved school and community partnerships, could incentivize them to return.

Other researchers (Darling-Hammond, 2003; Ingersoll, 2006) have engaged with the substantial data sets created by the *Teacher Follow-up Survey*, delineating a system-wide problem within education. Science teachers continue to leave the profession in large numbers. However, there is a dearth of research that utilizes qualitative methodologies to examine *why* teachers and *how* teachers make decisions regarding career trajectory. This collective body of current scholarship has highlighted a problem within science education, yet science teachers remain an understudied group, in terms of how and why they make their career trajectory choices. The data collected on science teachers is generally a surface examination of the factors involved with the career choices of the teacher participants, collected after teachers have made their decisions, using a prescribed survey.

### **The Rural Context**

To further complicate the issue of science teacher retention, excluding the *Rural Systemic Initiatives in Science, Mathematics, and Technology Education Program*, which examined the ‘third wave’ of systemic reform in action in rural settings, there is very little research on science teacher retention in rural areas (Arnold, 2005; Brownwell, Bishop, & Sindela 2005; Ingersoll, 2007). There is general consensus that rural schools present a unique context for schooling in comparison to urban and suburban schools (Arnold, 2005; Budge, 2006), yet there is a dearth of funds allocated to study rural contexts (Arnold, 2005; Sherwood, 2000). Rural schools operate under the same laws and with comparable expectations and goals as their urban and suburban counterparts yet few scholars are studying rural education issues. For example, in rural settings, one student failing to meet an academic goal such as passing a graduation test greatly affects

results for the whole school, whereas multiple students must fail in order to impact suburban or urban schools (Powell, 2009).

Researchers have indicated that, since each rural school and community is unique, constructing a universal set of core characteristics to describe or define them is difficult (Herzog & Pittman, 2003; Lewis, 2003; Oliver, 2007; Sherwood, 2000). Kathleen Budge (2006) demarcated common strengths and challenges that she found to occur across the spectrum of rural areas, which proved salient in the context of this study. These included (a) school and community interdependence, (b) an outmigration of young talent, (c) and an attachment to place.

**The Black Belt region of Georgia.** Uniquely situated in a rural region of the South that sociologists call the Black Belt Region, this area, historically known as the “cotton counties” and the “plantation counties”, is considered by many researchers and sociologists (Duncan, 1996; Webster & Jarrod, 2008) to have a distinct milieu. This identification has resulted in its designation as a region, even though it stretches through multiple states. The Black Belt spans from Virginia and Maryland, through the Carolinas and Florida, across Georgia, Alabama, Mississippi, Louisiana and Texas. In Georgia, this region stretches through 79 of Georgia’s 159 counties, and the residents continue to experience poverty rates consistently higher than the rest of the state and nation (Black Belt Commission, 2010; Levernier & White, 1998). Some states, including Alabama, have created commissions that focus solely on the social and economic needs of the people of this region, infusing resources in to the area due to the vast poverty (Black Belt Action Committee, 2010). Although some areas in Georgia prosper educationally and economically, researchers explained that the “new south,” popularized by the media does not exist in most rural areas. The “new south” is characterized by prosperous urban areas, such as Atlanta, Dallas and Houston, while the rural areas, such as the Black Belt region, have generally

lacked the political, educational, and economic infrastructure associated with the urban areas. Although urban centers have both wealthy and poor areas, there is increased awareness of the poverty in the urban centers, while rural areas tend to go unnoticed (Morris, 2009). The Black Belt region remains understudied, in spite of a drastically high dropout rate for high school students as well as an exceptionally high rate of teacher attrition (Arnold, 2005; Young, 2003; Morris, 2009). Scholars (Morris, 2009; Tyson et al., 2005) have suggested that rural areas in Georgia provide a unique context for studying African American schooling, since 90% of rural African American students attend schools located in the South (Cromartie & Beale, 1996).

## **Theoretical Framework**

### **Teaching as Way of Being**

This study sought to understand career trajectory of individual science teachers within a unique educational context. The researcher applied Allan Feldman's *teaching as a way of being* perspective which prioritized individual experiences within a particular context. Feldman conceptualized teaching as a highly contextualized, socially situated endeavor exemplified through a teacher's actions with particular students within a given context (Feldman, 1997). Rooted in constructionist epistemology, which concurrently rejects objectivism and subjectivism, Feldman's theory evokes an image of humans interacting with others, creating meaning through the experience. Feldman synthesized three previously constructed theoretical frameworks, teacher knowledge (Shulman, 1986), teacher reasoning (Schön, 1987), and a sociocultural perspective (Clandinin & Connelly, 1992), then added the *teacher as individual* perspective to construct his perspective. Synergistically, Feldman applied the aforementioned frameworks to encapsulate his delineation of a teacher.

The teacher knowledge perspective described teachers as individuals who possess various knowledge specific to the teaching field. Shulman's (1986) seminal work on pedagogical content knowledge influenced multiple studies (Grimmett & MacKinnon, 1992; Grossman, 1988) over the past decades. The studies focused on the specific knowledge that teachers construct over time. The teacher reasoning perspective, greatly influenced by Schön's (1987) work on reflective practitioners, encouraged people to think of teachers as thoughtful, reflective people who aimed to improve their practice. This perspective suggested that teachers act responsibly, understanding that problems have multiple solutions. Teachers then utilize their vast knowledge and reasoning skills to make the best decision for the individual student at a given moment in time. Collectively, the teacher knowledge and teacher reasoning perspectives constructed a vision of teachers as highly skilled, capable individuals by suggesting that coupling content knowledge with specific pedagogical skills improved the educational experience for students.

Feldman asserted that these two perspectives failed to acknowledge that teachers were people who constantly interpreted their environment in order to make meaning during each situation. Meaning, Feldman explained, was connected to the actions, beliefs, and intentions of teachers, not just their knowledge base within a particular context, which a sociocultural perspective added (Feldman, 1997). Feldman (2002) explained that the sociocultural perspective envisioned "teachers as individual beings acted upon and acting on their social context" (p. 1037). Multiple researchers (Roth, Lawless, and Tobin, 2000; Tobin & McRobbie, 1996) have constructed interactional models that focused on the intersection of a teachers' personal beliefs, students goals, and the specific context where the interaction occurred. For example, Clandinin and Connelly's (1994) sociocultural perspective described the teacher as a curriculum negotiator. This negotiation included knowledge and people (community members, administration, students

and parents), as well as the cultural, political, and economic aspects included in the teaching context. Feldman's construction of *the teaching as a way of being* perspective differed on the relationship between the individual context and the teacher.

Teaching as a way of being asserted that teachers and their actions are only understood within a given context. Rooted in existentialism, teaching as a way of being described the teacher as a *teacher*, not a person *doing* the action of *teaching*. People, Feldman (1997) explained, “exist first as who they are, as a product of history, biography, relations with others, and intentions” (p. 1038). The way of being perspective acknowledged that individuals exist in situations, which extend beyond context to encompass personal experiences as well as intention for the future (Feldman, 2002). Thus, teachers do not possess knowledge of context as Shulman (1986) postulated, but rather teachers act within contexts that are further subsumed by situations. These situations included influences from multiple lived experiences, including “traditions, institutions, custom and the purposes and beliefs they carry and inspire” (Dewey, 1938, p. 43). The situational aspect of this theoretical perspective prioritized the impact of human interaction on the person and situation, inextricably linking the teacher with the job of teaching. To truly understand the way a person *is* a teacher, research must illuminate the teacher's humanness, their intentions, actions, and the understandings of the individual students within the particular classrooms (Feldman, 2002). As evidenced by the researcher's chosen methodology, this study prioritized a keen understanding of the teacher's actions within their particular school.

### **The Study**

Within this particular region, the researcher situated this study in four contiguous counties: Five Points, Lorraine, Gray, and Wilson Counties (all names are pseudonyms). The researcher conducted professional learning at Five Points Charter School (FPCS) for three years,

developing deep respect for the teachers, students, as well as the community of Five Points. Through the years, the researcher experienced the difficulty FPCS faced recruiting new teachers, which led her to design this study. The researcher began with FPCS, and then worked with experienced teacher educators and other individuals to identify similar school systems. The identification of this group of schools allowed her to examine how teachers within different schools with similar characteristics made career trajectory decisions. Based on those similarities, the researcher chose Lorraine, Gray, and Wilson, each of which was geographically contiguous to Five Points County. Each county was characterized by a decreasing population as manufacturing and agriculture have declined throughout the area (Boatright & Bachter, 2006; Census, 2007). Each county contained one k-12 public school option for its residents that bore the name of the respective county. Each of these schools has experienced rates of teacher turnover higher than the national average, sometimes reaching 50% in one year. Demographically, the student population was characterized by 65% or higher African American as well as poverty rates surpassing the state and national averages characterized each county. The demographics of the each school population is summarized in Table 5.1.

Table 5.1

*Specific Demographic Information for Schools in Study*

School Name	School Size	Economically Disadvantaged Students	Student Demographics	Graduation Rate 2009
Five Points PreK-12 Charter School	219	94%	95% African American	68%
Gray County High School	536	77%	70% African American 30% Caucasian	75%
Lorraine County High School	448	59%	65% African American 35% Caucasian	76%
Wilson County High School	478	70%	65% African 34% Caucasian	89%

The following research questions guided this inquiry:

1. *What tensions do science teachers experience regarding career persistence in rural schools?*
  - a. *How are these tensions associated with professional dimensions of rural science teaching?*
  - b. *How are these tensions associated with personal dimensions of rural science teaching?*
  - c. *How are these tensions associated with contextual dimensions of rural science teaching?*

*2. Within the context of this study, what implicit or explicit cultural myths impact science teacher retention?*

## **Data Sources**

The researcher constructed a detailed timeline, due to her desire to construct more than a one-time “snapshot” of the tensions impacting teacher choice. Instead of collecting data one time, the researcher paced data collection to span a nine-month period. She utilized multiple methods of collection in order to triangulate findings and render a more detailed interpretation of the individual teacher’s experiences. Table 4.2 integrates the timeline and aligns each data collection method with the associated research questions.

For each participant, the researcher collected and summarized observation and interview data. Specifically, the researcher conducted in-depth life history (Goodson, 2006) interviews as well as semi-structured (Patton, 2002) interviews. After completing preliminary coding of the interview data, the researcher constructed a focus group protocol aimed at capturing a collective vision of teaching within each of the four schools. Coupling focus groups with the individual life story interview provided participants with the opportunity to explore their individual views as well as those of their peers while providing the researcher with rich data on the dynamics within each particular school. Preliminary coding of the interview transcripts suggested a number of broad themes from which more detailed codes were subsequently derived. Themes and sub-themes were examined across the 11 cases where the researcher aimed to explore the context in which teachers taught, so that she could understand how individual teachers perceived tensions that arise from personal, professional, and contextual dimensions of their job.

Table 5.2

*Matrix of Research Questions, Integrated Timeline and Data Sources*

Data Sources	Date of Data Collection	Overarching Research	Guiding Question	Guiding Question	Guiding Question
<b>Bold=primary data sources</b> <i>italic=secondary sources</i>	Year 2009	<i>What tensions do science teachers experience regarding career persistence in rural schools?</i>	1	2	3
<i>Demographic Map</i>	February-March	<b>X</b>			
<b>Life History Interview</b>	March-May	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Focus Group 1</b>	April-June	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Semi-structured Interview</b>	July-September	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Focus Group 2</b>	September–October	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<i>Archival Data</i>	March-September	<b>X</b>			

**Data Analysis**

Data analysis occurred in three phases, beginning with implementation of constructivist grounded theory methods (Charmaz, 2006) to identify and name each line of the data set.

Specifically, after transcribing each data source and reviewing the reflective memos associated with each data source, the researcher created a code that described each line of the data utilizing

Charmaz's 'gerund' technique. This encouraged the researcher to detect processes within the data and stick closely to the individual set of data (Glaser, 1978). After completing all of the data collection for the study as well as initial coding of the data set, the researcher re-entered the data, where she focused the coding on the experiences, actions, and interpretations that teachers within and across schools made during the interviews and focus groups. This distilled the initial code set from over 400 codes to 10 theoretical domains, each of which focused on a tension experienced by the science teachers that related to retention and attrition.

In conjunction, the researcher adapted Frederick Erickson's interpretive model to generate assertions (Erickson, 1986). Erickson explained (1986), "the basic task of data analysis is to generate assertions that vary in scope and level of inference, largely through induction, and to establish an evidentiary warrant for the assertions one wishes to make." (p. 146). Multiple evidences from data supported each key assertion to demonstrate *generalizability within the corpus*. After generating an assertion, the researcher re-examined the entire data set, looking for disconfirming and confirming evidence, regarding each assertion. After this process, assertions were warranted by the data.

## **Results**

### **The Emergence of Wilson County High School as an Exemplar**

Using archival data, the researcher found that each of the four county schools studied experienced teacher turnover rates that ranged from 33% to 60% from 2006 through 2009. Within the science departments specifically, turnover varied, ranging from 33% to 50%, with the exception of Wilson County High School (WCHS), which had a 100% return rate for its science teachers and emerged as an exemplar. By comparing the graduation rates of students from 2001

to 2009 as well as the quantity of teacher turnover, WCHS appeared unique, boasting the unparalleled graduation rates of 89% as well as a 100% retention rate within the science department. These unparalleled successes beg the question, *what* is happening within the four walls of Wilson County High School? Table 4.3 highlights the turnover results for the 2008-2009 school year for the four county region as well as how many teachers *tried* to leave their school. Due to the budget crisis in Georgia, many teachers were unable to find alternative jobs, so they stayed at their school; however, it is important to note that they wanted to leave.

Table 5.3

*Teacher Choices for the 2008-2009 School Year*

<b>School</b>	<b>Five Points</b>	<b>Gray</b>	<b>Lorraine</b>	<b>Wilson</b>
Total number of Teachers	2	4	3	3
Teachers who Stayed	2	3	3	3
Teachers who Tried to Leave	0	1	0	0
Improved Graduation Rates	Yes	No	No	Yes

Although Lorraine retained all of the science teachers in 2009, the administration expressed dissatisfaction with two of the teachers, due to their lack of instructional compliance with the national curricular standards. However, at WCHS, the science teachers were told by the administration that they were doing well with their individual jobs. However, the WCHS

teachers explained that the administrators rarely, if ever, observed them. Table 4.5 describes the demographics of the individual teachers at Wilson County High School (WCHS).

**The Wilson county high school teachers: Individual paths to WCHS.** In 2001, WCHS graduated less than 50% of senior students, due to their inability to pass the science portion of the Georgia High School Graduation Test (GHS GT). Last year, 89% of students graduated. In fact, 97% of the students passed the science portion of the GHS GT. This increase compared with previous student performance resulted in receiving the designation of “distinguished school” by a Georgia education agency. The change in student accomplishment that resulted in this designation created a question: What has happened at WCHS, the only high school choice in the county, that could have impacted student performance in such a positive manner?

Table 5.4

*Teacher Profiles at Wilson County High School*

<b>Teacher's Name</b>	<b>Cultural Group Identification</b>	<b>Homegrown Status</b>	<b>Education Level</b>	<b>Certification / Teaching Responsibilities</b>	<b>Years Teaching</b>
<b>Mary</b>	African American	YES	M.S. Chemistry B.S. Chemistry and Biology	Broad Field Secondary Science, grade 7-12 Chemistry Physics	8
<b>Jessica</b>	Caucasian	YES	*Ph. D Science Education B.S. Horticulture	Biology, Secondary Science, grade 7-12 Biology	6
<b>James</b>	Caucasian	No	M. Ed Science Education B.S. Business	Business and Broad Field Secondary Science, grade 7-12 Accounting 1,2 Physical Science Biology	4

*\*Denotes in progress*

The science department began the transition when the principal hired Mary Gates as the new department head at WCHS. Mary, a Wilson County native, returned to the county eight years ago to begin teaching science after retiring from a prestigious corporate career. For 20 years, she led product development for a large chemical company located in Delaware. Mary, an African American who attended WCHS during the era of desegregation, completed a dual college degree in biology and chemistry as well as a M.S. in chemistry before leaving the South for twenty years. When asked why she returned, Mary explained, “My best friend’s husband had

been hounding me for years to come home and turn the science department around, since only 50% of the students were passing the science portion of the GHSGT. I kept telling him, when I could afford it, I would.” Eight years ago, her father died, so she decided to move home to help care for her aging mom. “I can’t tell you that I always dreamed of teaching, but I can tell you that my circumstances placed me here and I’ve been working harder than I ever worked before.”

When asked about her first impression of WCHS, she explained:

It was a complete and utter mess. I was overwhelmed by the number of names of different science teachers that I found on boxes in the stock rooms. I decided on day one that I would build a department that would teach all of the students science and I would recruit teachers that would stay at WCHS, putting a stop to this ridiculous turnover.  
(Interview, May 2009)

Six years ago, she hired Jessica, a thirty five year old with familial ties to Wilson County. For three years, Jessica had worked in a laboratory setting before deciding to pursue a teaching degree. After completing her M. Ed from a research institution in the state of Georgia, she entered the classroom with a vision of inquiry science for all of the students at Wilson. Jessica explained, “I believed from the moment I started teaching that all kids would learn and all kids could graduate, if I taught them well.” Jessica has continued her formal education in science education, as she works toward her PhD.

The last teacher to join this team was James, another second career science teacher, who tried for years to get a job in Wilson County, where he lives with his wife. For ten years, James worked in the corporate world, where he was extremely successful, yet he also felt called to teach. After making a personal life change, James decided to fulfill his calling, where he began his career teaching provisionally in the business department, while concurrently completing a

master's degree in science education, due to his desire to teach science. Collectively, Mary, Jessica, and James have diligently worked to create a science department where they prepare all students to go to college and succeed. When asked individually or collectively, Mary, Jessica, and James explicitly stated that they believed each student that they taught would be prepared to attend college. This evidence of unity within their shared vision served as the basis for the first assertion (Erickson, 1986).

*Assertion I: Science departments that share a vision for students' goals and teachers' responsibilities persist.*

All of the teachers who participated in the study conveyed goals and aspirations for students as well as individual teaching initiatives. These goals and initiatives were, in each case, comparable with the goals and initiatives set forth by the teachers at WCHS. However, no other science department conveyed a shared vision of those goals and initiatives. Collectively, the Wilson County High School teachers expressed a unique sense of unity in terms of the significance of their goals for students as well as the responsibilities of the individual teacher.

**Teachers' goals for students at WCHS.** When Mary described why she teaches, she explained:

This is my eighth year teaching and I still don't feel like I've gotten it right. So, for years, these kids have had teachers who never stayed, never improved their teaching, and they learned to dislike science and they believed that science wasn't for them. I experienced a life where education opened doors for me and in this declining economy; our kids need a diploma earned through a solid education. (Interview, May 2009)

Although Mary has played a pivotal role in improving the test scores of students at WCHS to over 97% on the Georgia High School Graduation Test on the science portion of the exam, she continued to strive to improve her teaching in order to improve science learning. Mary set a collective goal for each student at WCHS to graduate from High School, due to her belief in the ability of the students as well as her understanding of the economy in Wilson County. Mary continued to describe her goals and aspirations for her students:

...so our kids don't have as much money as say a kid from some suburb, that does not mean they should be short changed. So, whatever we can do as teachers to make ourselves teach at a high level so that they can compete, that's what we do. No one should suffer because of where they were born or the color of their skin. (Interview, May 2009)

Again, Mary articulated her understanding of Wilson County in relation to areas outside of the county. Mary, having been reared in Wilson County, carried with her a set of beliefs about the nature of the needs that students in this district were struggling to overcome. This set of beliefs simmered for years while she was a graduate student and then a professional chemist. These beliefs about the students and community undergirded her notions of what she believed inhibited students in Wilson from pursuing their dreams. Mary spoke candidly about economic and demographic gatekeepers that she believes students may successfully negotiate *if they understand the nature of the barriers*. Mary explained:

I talk openly with children, telling them that they have to work harder, maybe harder than some other child, if they want to go to college. Many of their parents didn't go to college, but they didn't have to go. It's not that they're bad parents, but it has made this

generation of students fail to recognize the doors an education will open. (Interview, May 2009)

Through this explicit teaching, Mary explained that students “step up to the plate” and do what is needed to graduate from high school, as evidenced by the 89% graduation rate. Mary has been teaching her students how to negotiate life, which she described as inherently unfair, “a fact of life.” What she believed she has offered them, was the “knowledge to decide whether or not they are willing to work hard and reap the benefits education can provide” (Interview, May 2009). Mary explained that students, when assisted by knowledgeable teachers, realized the importance of attaining a high school diploma, they began to value their education. Mary continued, “as you can see by our 89% graduation rate: our kids are stepping up.” At WCHS, teachers believed that they helped their students to understand the importance of a high school diploma. During Jessica’s life history interview, she described similar teaching goals:

I was raised to respect practical education, not degrees for the sake of degrees. When I teach, I want kids to understand, practically, conceptually, what is going on. I ask them, how you know what you know. I teach kids conceptually, explicitly teaching them to question me and any other source of information so that they can use knowledge. I want them to feel empowered to negotiate on their own behalf, so that when they walk in to their first college science class, *the weed-out course*, they will have the knowledge to understand it and the political savvy needed to play his or her game. (Interview, May 2009)

Jessica, who graduated as salutatorian of her rural high school class, recalled the difficulty she experienced when she started college:

When I sat in my first chemistry class, I realized that I didn't know what the other kids knew. I felt so intimidated by them as they whipped out their notes from the advanced chemistry class from high school. You see, we didn't have those classes. It took me the whole first semester to realize that I was just as capable as those other kids that had taken all the advanced courses that weren't available to me. (Interview, May 2009)

Jessica continued to explain her desire to create an environment that challenges students so that when they go to college, they are comfortable being uncomfortable.

I had a former student show up last week needing help in anatomy. She is working on her nursing degree and is struggling. I worked with her, gave her some resources, and we set up some tutoring time. You see, we have follow through here, it's not just a matter of getting them to pass a test or getting them in to college, it's a matter of being there for them for life. We the teachers are an extra resource that I bet suburban schools don't have; my kids know where I live and come knock on my door (Interview, May 2009).

Together, Mary and Jessica exemplified Allan Feldman's *teaching as a way of being perspective* (Feldman, 1997). Both Mary and Jessica understood their school context and community and utilized this knowledge, practicing what Feldman named teacher expertise or *wisdom in practice*. Mary and Jessica's keen understanding of their students, their content, as well as their teaching practices exemplified their holistic understanding of the needs of their students within this particular time at WCHS. Mary and Jessica strove to challenge each student daily, while concurrently preparing them for college. Together, they hired James, the new teacher in science, after they clearly delineated their goals for him as a newly certified applicant.

**The effects of shared vision on hiring and induction at WCHS.** Mary and Jessica constructed a vision for the new teacher based on their *wisdom in practice*. Mary and Jessica explicitly delineated the goals of their department during the hiring process, which included excellence in teaching and a collaborative professional culture, in which the science department works together to vertically align courses and labs. They chose James, a member of the community, who was teaching at a neighboring school. Mary explained:

When we finally received the go ahead to hire, we (Jessica and Mary) did our homework. We talked to his principal and other teachers. We talked to kids that knew him from church. Then, we asked him some tough questions about discipline, pedagogy, and future plans. We wanted to make sure that whomever we hired had similar ideas to ours. Now, we're not looking for clones, just similar goals (Focus Group Interview, April 2009)

During an individual interview, James explained his perception of the department's goals:

When I first visited, I thought maybe they were too strict, giving out academic detentions and tardies so quickly. But over this last year, I've realized that what they do works and I do it, too. These kids are smart and they work hard, if you give them the boundaries they need. They (Mary and Jessica) have taught me to understand these kids better. They tell me that if I'm being honest, if I had my choice, would I work hard or would I take a nap some days? We are teachers and WE understand the ramifications for these kids if they do not graduate, THEY don't, not at age fourteen, when neither of their parents has a degree. (Interview, April 2009)

Jessica explained what she called the silliness of some of the rules at WCHS, one of which focused on pants. For a time, students were taken out of class if their pants were too revealing.

This occurred during the same time-frame that the Atlanta City Council proposed legislation to ban baggy pants. The science teachers began advocating for academic detentions, which they administered when students failed to either complete assigned work, homework or class work. Mary explained, “if they can rip a child out of my lab because his pants are too baggy, then I can give him detention when he does not do his work” (Interview, May 2009).

James continued to explain how his ideas regarding the interconnectedness of student and teacher responsibilities transitioned during his first year at WCHS:

I honestly used to think that if a student chose to sleep or not do their work that it was *their choice*. I look at that differently now, since I now realize that kids are kids and I am the adult. Sleeping is not *their choice* unless I allow it. Students off task is not *their choice* unless I allow it. It is *my* job to run my classroom in a way that gets all my kids excited about science and ready to work. (Interview, April 2009)

James expounded on the importance of the way in which his teaching has transitioned, due to the mentoring he has received from Mary and Jessica:

I cannot explain how important it is that I now take responsibility for students’ actions within my classroom. At my other school, I had great lesson plans, I was always well prepared, because I *knew* that was my job. What I did not understand until I began teaching here was that I was responsible for my students’ engagement, my students’ work ethic in my classroom. (Interview, 22 May 2009)

As James continued to discuss his entry into teaching at WCHS, he described the like-mindedness of Mary and Jessica.

Even though I had taught for two years at another school, these women have worked with me like I was a new teacher. They have offered me every type of lesson plan you could imagine. If I am having a trouble with a lab, one of them will come over and help me right then. I cannot tell you how many times Mary has asked me if she could help me set up a lab or break one down or how many times Jessica asked me to think through *how* I was teaching a concept. (Interview, April 2009)

Due to the shared vision at Wilson County High School, Jessica and Mary have mentored James, providing resources, advice, and critique, which created a stimulating professional environment for him. The WCHS science department has created a professional environment where teachers strive to improve their practice, assist each other with teaching, and understand the context in which they teach. Collectively, they shared a vision for their job, which included a personal level of responsibility for helping each student to graduate from high school. After high school graduation, they transitioned responsibility to the individual student. Jessica explained:

I'm not in the business of deciding what kids should choose for their career. That is their choice. My focus, my vision for my students is that they are provided with an education that enables them to choose. (Interview, May 2009)

WCHS teachers conveyed a common vision for their students as well as well as for teachers. WCHS continually challenged themselves to improve their individual practice. One hundred percent of the teachers within the study articulated the role of the teacher, many of whom indicated facets of the vision constructed by WCHS teachers. However, no other county school conveyed a collective vision of the individual teacher's responsibility.

**Teachers' responsibilities in the WCHS science department.** During the first focus

group, the researcher asked the science teachers at WCHS to talk about what they believed caused the dramatic turnaround in graduation rates and teacher retention. Jessica began the conversation stating:

Well, you might think we sound extreme, but you have to understand that we know these kids. There is a different level of personal accountability when you see these kids at the grocery store, at church, or you went to high school with their sister or uncle. These are my people, so just keep that in mind because I know that not everything we do is aligned with the latest and greatest teacher research. (Focus Group Interview, April 2009)

The teachers in the science department at WCHS felt that their actions are viewed by other teachers in the school as extreme. These teachers required students to begin working before the bell rings, or they were marked tardy. Students were taught to work until the bell begins to ring, which signaled the end of class. Then students were allowed to pack up or sharpen pencils. If a student failed to complete his/her homework, they received an afterschool detention. Mary explained:

We do not give busywork. If students do not do what we ask them to do, then they will fall behind. So, if they don't do their homework at home, they will do it sitting beside me. I refuse to let them sabotage themselves in my classroom. (Interview, May 2009)

Jessica continued, "what we strive to create is an environment where kids want to succeed, where learning, for the sake of learning sake is valued and to do this, we all believe that we should stay up-to-date with our science knowledge." The WCHS believed that each student should graduate from high school. From the discipline procedures implemented to the academic rigor imposed, the teachers pushed students, explicitly teaching them how to succeed in a

classroom. Whenever a student failed to meet an expectation, the teacher required the student to complete the specific task that had been missed, whether it was a lab, a paper, or test. The second component stressed by the department focused on their belief that if they expected students to continually learn science, the teachers should continue to inquire into science as well, increasing their pedagogical and content knowledge.

**WCHS teachers: Committed to improving their own education.** The second component of Feldman's perspective asserts that successful teachers must have a thorough knowledge base of the science content. Mary, Jessica, and James had extensive science content knowledge that they continued to sharpen and deepen through coursework and reading. Jessica explained:

I love spending my summers working on professional learning that can improve the way I teach, working with teachers that will critique my teaching, helping me to improve. For the last three summers, I have participated in professional learning that couples science research and science teaching, integrating the two. It's my job to know science in such a way that I can convey it to my students in a deep, meaningful way. (Interview May, 2009)

Similarly, Mary and James each attended multiple professional learning opportunities that focused on enriching their science content knowledge. "Now that I'm not in the lab every day, I have to work a little harder to keep my skills sharp. I try to find at least one opportunity a year to get back into a lab" explained Mary. During the focus group, Jason laughed as he explained, "Who needs professional development when you have Mary and Jessica helping you? They keep me on my toes!" James continued, "I am learning a lot through my M. Ed coursework, so I try to

apply that knowledge to my students.” Jessica, who finished her coursework for a PhD in science education during the summer, conveyed a similar notion:

I can’t imagine not continuing to learn; there is so much research out there that I utilize in my teaching so that I do it better than the time before. The only problem with graduate school is all the negative talk I hear about schools. Some of those graduate students are running away from the classroom, when I just want to learn how to do my job better (Focus Group Interview, April, 2009).

Each of these science teachers prioritized improving their teaching and understanding of science through professional learning. However, none of the teachers at WCHS has experienced science professional learning within their *own* school. Instead, they have had to take the initiative and find professional learning outside of their county. “We always laugh when it’s a professional development day (at WCHS) because we know that it won’t be valuable for us,” James explained, while Mary and Jessica nodded. “Instead, we utilize each other to improve our teaching, by meeting and discussing what we do” Mary added, which aligned with Feldman’s notion of *deliberative wisdom*.

Feldman explained that teachers gain deliberative wisdom by reflecting on the teaching process. Mary explained, “The more I teach, the more I realize how I can do something better. So, do my lessons look the same? No way, every time I teach something, I build on it; I change it and improve it.” James added, “You see, they’ve taught me that I have to be willing to try stuff, even if it fails, because I might learn a better way to teach a concept.” This trio implemented a quick conference where they discuss daily which lessons were beneficial to the students and how they could alter them for the next time they taught the lesson. Jessica continued, “now, we still do our own thing, we try different things, but we always talk about what we taught and how we

might do it better next time. Our goal is improving our pedagogy.”

Collectively, WCHS science teachers conveyed a sense of shared vision during the April 2009 focus group interview, which was triangulated during analysis of the individual interviews. All of the teachers understood the tremendous responsibility they had as teachers, and strove to improve their teaching through professional learning and reflective practice. Together, Mary and Jessica mentored James by challenging his thinking and teaching, providing him many opportunities to try new pedagogy techniques, and lending assistance on the discipline-specific issues associated with the laboratory. The group worked as a team, and they conveyed a collective sense of unity and satisfaction with their careers. Each of the science teachers at WCHS signed their contracts the following month, indicating that they planned to stay at WCHS for the 2009-2010 school year. Had data collection stopped with this “snapshot” of the tensions impacting WCHS science teachers’ future career trajectory, the researcher would have reported WCHS as a school where science teachers experienced only unbridled success and satisfaction. However, as the researcher continued to build relationships with each teacher, watching them teach and observing their school setting, the WCHS teachers began articulating professional and contextual tensions that impacted their personal satisfaction with teaching.

### **Why We Might Leave: Adding Depth to the Snapshot of WCHS**

Over the summer, the researcher conducted more individual interviews, preparing for the second round of focus group interviews, which occurred after the science teachers at WCHS began the 2009-2010 school year. After analyzing each of the life history and semi-structured interviews, themes of deprofessionalization emerged in relation to procedural aspects within their school and in relation to the constraints felt due to administration’s interpretation of standards and accountability. The researcher conducted the second round of focus group interviews eight

weeks into the first semester of the school year at WCHS. Analysis from the second focus group as well as excerpts from individual interviews provided the data to support the following assertion:

*Assertion II: Deprofessionalization leads science teachers to pursue alternative employment.*

**Hijacking James' job.** The researcher began the focus group by asking: "how are classes going right now, eight weeks into the new semester?" James smirked, then replied, "Well, do you want to know about the business courses I'm teaching or the science courses?" (Focus Group Interview, September 2009). In response to the startled look on the researcher's face, James continued:

They (the principal) saw my wife in town, two weeks before classes started, and told her that he needed to talk to me about next year. I called him three times before he returned my call. When he did, he told me that he needed a favor from me. Due to enrollment, he needed me to teach business classes half the day and science classes half the day. So, I'm teaching Accounting 1 and 2 during first period, two preps in the same classroom, then I'm teaching two sections of biology. Keep in mind, that means I'm in two different buildings, prepping these different classes and he's already told me that next semester, I'm teaching business law, physical science, and biology, so I have six different preps this year. (Focus Group Interview, September 2009).

Due to James' dual certification, the principal chose to split his time between business and science courses in order that the school could offer more classes. Cancelling two science classes required that the registrar increase the number of students in the remaining course offerings to the state maximum. Mary, the department head added:

The principal did not ask James or me about his idea to divide his teaching time. That man has never darkened James' door, so he has no clue how he is teaching and yet he's going to invoke a burden like this on James? If he had consulted James or me, maybe we would not feel so blindsided. It is insulting the lack of professionalism we experience here (Focus Group Interview, September 2009)

James continued:

Mary has been observing me and working with me on incorporating more labs in my teaching. I know this is my weakness and yet, you tell me, how can I improve this if I don't have any prep time? I'm in a different building, teaching something else, that's not related to science I'm here until six o'clock every night and I just can't get it done. And all I can think about is that I'm not preparing my kids for those End of Course Tests (EOCT). (Focus Group Interview, September 2009)

As the conversation continued, Mary and Jessica tried to encourage James, offering to help him prepare labs as well as lessons. However, the theme of deprofessionalization continued to loom throughout the focus group. Jessica transitioned the conversation to her own personal encounter with deprofessionalization that resulted from a confrontation with her administration.

**Devaluing my professional knowledge.** During Jessica's individual interviews, she told story after story of her administrators telling her 'no' regarding her ideas for course offerings and after school opportunities for the students. She received advanced placement certification in biology, with the hope of implementing the course at WCHS. However, the administration refused to add the course offering. Jessica explained:

Our kids are competing for college slots against students who have advanced placement credit. Those kids get extra points because of that coursework and my administrator refuses to let me offer it. I have explained this to him, but he refuses. He refuses to think outside of the box and construct a schedule that would permit me to offer a class my students need (Interview, August 2009).

Her second example focused on a conference she wanted to implement at WCHS, where parents and community members would come to the school and attend sessions on clubs, college applications, athletic events, as well as any other topic that a teacher chose. Jessica continued:

I can explain away why I was told “no” regarding AP biology or even the conference. I do not agree, but I understand their point of view. However, when they began managing resources, treating me like I am a toddler, it makes me look at every other time they told me no with skepticism. (Focus Group Interview, September, 2009)

As Jessica shared this story, which all too often teachers share, apathy entered her voice. Jessica continued:

I can sum it up with one story. When I have to sneak around and steal the tools I need to do my job, it's time to go. It belittles me when I have to steal copy paper because I've used my monthly allotment. I've read the research and I understand that when students highlight while they're reading or write their own notes beside diagrams, they are more productive. Instead of equipping me to do my job, they lock the paper up and make me ask an administrative assistant to please let me have more. Then, other departments literally show movies at least once a week and nothing is said to them. I want to teach- can't I just have some paper? Now remember, five years ago, I sat in a meeting where the

administrators asked us what we were doing wrong, since our failure rate was so high on the Georgia High School Graduation Test. Well, no one has asked me what I'm doing right, now that we have a 97% pass rate. Instead, they just berate me. (Focus Group Interview, September 2009)

Jessica was forced to steal copy paper in order to provide what she believed students needed. Even after she provided her administrator with the research that supported her chosen method of study, he refused to allow her access to the amount of copy paper needed. Mary added, "it infuriates me that they are laying sod on the front of the building, so it will look nice, but they will not give me and my teachers paper." James added, "You forgot to mention that we are not even allowed to have keys to this building. Maintenance workers have keys, but we are not trusted with them." Jessica, Mary, and James each discussed multiple examples of deprofessionalization within their context, which they found unforgivable. When the teachers discussed difficulties, such as the plethora of preparations or lack of resources within the conversation of deprofessionalization, difficulties transitioned into reasons to leave the profession. The third component of deprofessionalization centered on issues of implementation of standards and accountability at WCHS.

### **Deprofessionalizing Teachers in the Name of Standardization.**

Collectively, 100% of the science teachers that participated in this study believed that standards and accountability could improve teaching and learning if appropriately utilized and implemented. When discussed with the WCHS teachers, who boasted a 97% pass rate on the Georgia High School Graduation Test in sciences, Mary, James, and Jessica expressed the constraints the system imposed. During Mary's semi-structured interview, she explained:

I make sure that my department understands the best practices in our field. We read journal articles, we attend professional development, and two of them are working on higher degrees science education, yet no one cares about this. They do not care that we do labs every day or that we integrate other subjects within our class. They have only one indicator for success and that indicator (standardized tests) does not align, even remotely, to what we know kids need to understand about science. There is no push for excellence when you make or break students and teachers based on one multiple choice test. (Interview, October 2009)

Mary, Jessica, and James believed that their students were assessed based on a test that failed to align with the standards put forth by NSES, AAAS, or institutions of higher education. Jessica explained that she was prohibited from seeing the given test or playing any role in constructing it. The teachers at WCHS felt the primary communication to them was that they do not know what they are doing and that they cannot be trusted to make decisions about the students they teach. Jessica articulated this:

What gets me is that the test is not used to figure out whether or not they(the students) know something; there is a level of accountability stamped on it that keeps students from getting their diploma or passing a class, based on one test. What does that say about my job? They do not respect me enough to let me decide if a child has learned enough or let me write the test that determines this. (Focus Group Interview, September 2009)

All three of these highly qualified science teachers expressed a deep concern over how their job has morphed into one that differs greatly from the one they began a few years ago, as Mary articulated in her final interview:

At one time, I *knew* that I was providing the best education for the students I could during my science classes. Now, I do not know. Sure, my students excel on the tests, and yes, I do my best to infuse inquiry and align with the national documents, but I compromise. I teach the test because I have a *moral* ethic that I believe is just as important as the science I teach. And that moral ethic involves doing *my part* to help *all* of my students get their diploma. So, do I teach as much inquiry as I know I should? No. And to be honest, it's getting to me. (Interview, October 2009)

James continued, "I want accountability for my job, for what I do. I used to believe that teachers were slackers. I want accountability that figures out who does their job and who does not and offers contracts based on that." James concluded by stating:

During my fourteen years in the corporate world, I never experienced this need that others have to tell me what to do, like they do in education. Where does that mentality come from? We have advanced degrees, we manage, if you want to use that word, over 100 people a day, and yet, everyone acts like we don't know what we're doing. (Interview, May 2009)

As the researcher concluded the focus group, she asked the question, "will you be here next year?" James quickly responded that he planned to stay. However, both Mary and Jessica did not respond. Mary finally broke the silence and stated, "I don't know. It depends on whether or not I believe I'm helping students more forward with their education." Jessica simply stated, "For the first time in my career, I cannot answer that question. I moved here to teach these kids, but I no longer have an answer for you." Later that day, Jessica emailed me from her home account, telling me that she had contacted her prior employer who ran a research lab to discuss career

opportunities. At the time of the writing of this manuscript the question of whether these teachers would stay at WCHS or leave for another site hangs in the balance.

### **Conclusions**

The purpose of this investigation was to examine how successful science teachers view their job within a hard-to-staff rural school. The researcher specifically focused on WCHS due to the exceptional growth in the graduation rates for students as well as the impressive rate of retention for the highly qualified science teachers at the school. Previous approaches implemented to explore this issue by other researchers have correlated science teacher attrition with demographic trends, such as the socioeconomic status of the students, the skin color of the students, or context specific characteristics of the school and community, such as pay or working conditions (Hornig, 2009). By using an in-depth qualitative approach to explore each individual teacher's perception of their job, the researcher found that at WCHS, the issues influencing the science teachers' job satisfaction and their subsequent decision to stay or leave the profession were not explained by student demographics or location. Utilization of Feldman's (1997) *teaching as a way of being* perspective assisted the researcher in understanding the actions of individual teachers within their situation. context. Instead, teachers at WCHS created a professional, collaborative environment, creating an ideal learning-to-teach experience for James. This group of three encouraged each other and assisted one another, which led to a collegial environment where teachers were not isolated. This mentoring did not cost the school system anything; rather, the teachers drove this effort by their collective vision for science teaching and learning. Due to three main issues that the WCHS that teachers perceived as deprofessionalization, two of these science teachers are strongly considering leaving the teaching profession. The way that the school has interpreted the accountability measures, a lack of input

in decision-making, as well as resource *mismanagement* in this particular place, two committed teachers are rethinking their career path. When asked whether Jessica and Mary would consider teaching at a different school, they each indicated they would leave the profession completely. Although context related dimensions of their job caused the problems influencing their satisfaction, neither teacher believed that other schools were capable of solving the issues. Jessica explained, “You have to see the bigger picture here. It’s not simply a case of one poor administrator mismanaging a school. Our educational system has become a system that handcuffs all of us, administrators included.”

If the teaching profession continues to morph into a job where teachers are not recognized as qualified to make decisions, autonomous, independent thinkers will continue to leave the profession. When success is defined only by who can best teach students how to make high scores on a standardized test, an assessment that individual teachers were not even allowed to see, *who* will the profession attract and *who* will leave? WCHS successfully taught their students how to achieve on the standardized tests required by the state of Georgia, yet they were still deprofessionalized. These teachers knew and understood the pay, the demographics, and the location in which they chose to teach before taking the job. What they did not foresee was the job description change they would have to endure, without any fruitful means to negotiate.

### **Implications**

Science educators must educate and advocate on behalf of the teaching profession, on two different levels, beginning with teaching methods courses. Science educators must explicitly teach the realities of schooling amid this era of standardization and accountability. For example, methods courses should address the time constraints felt by public school teachers. Moreover, methods courses should explicitly teach how to align inquiry based science within a prescribed

curriculum. When higher education fails to recognize the realities of the public school institution, teachers will continue to enter classrooms, experience culture shock, and leave, before the help to invoke change.

The second area of focus for science educators must include teaching policy related issues through a course of school organization and federal law. Most future science teachers never take any courses on policy. How might the profession change if science teachers, who have typically resisted movement into administration, learned how the system worked, then possibly chose this avenue for future advancement?

Third, as evidenced by this study of science teacher retention, attrition, and migration, when science educators and science teachers collaborate, new ideas develop. Science educators must visit and work within public schools, building long-lasting, deep relationships with one another so that together we can make a difference in teaching and learning. Science educators and science teachers must create a collective vision for the role of a professional science teacher. When asked what measures would serve as indicators of excellence, the science department faculty at WCHS offered multiple measurable areas that could serve this role and could also be measured by administrators.

- Professional Learning- Require science teachers to attend a certain number of science related professional learning opportunities annually
- Lesson Plans- Science instruction lesson plans can be evaluated for the presence of goals that align with the AAAS, NSES, and GPS.
- Assessments- Evaluate formative and summative assessments used by science teachers to ensure alignment with national and state standards as well as to ensure their validity with regard to student knowledge growth.

- Standardized Assessments- Collaborative examination of standardized test score data will be conducted to ensure administrative recognition of student accomplishment and to ensure that all stakeholders are aware of how student performance that is apparently curriculum related will be addressed.
- Punctuality and Attendance – Does the science teacher show up for the job in a timely manner?
- Collaboration-Science teachers should recognize the importance of working with others within the field to improve teaching

During the second focus group, WCHS teachers listed these six suggestions for improving science teaching and learning. As evidenced by their success, due to their collective vision for teaching at WCHS, science educators and science teachers, could improve the profession immensely by creating a framework for assessing science teachers based on the aforementioned. Science teaching requires that teachers utilize a set of skills particular to the discipline, which indicates the need for a unique method for assessing the productivity of science teachers, one that reaches beyond students' scores on a standardized test.

Finally, administrators in schools must learn to manage their teachers by hiring, then supporting and fostering teacher leaders within the school. Regardless of the size of a school, administrators are generally unable to truly understand the individual teaching climate that is created in classrooms: there is not enough time in the day. In order to successfully monitor, support, and improve teaching and learning, department heads, like Mary, could assist in this process. However, administrators must willingly acquiesce perceived control in order to do this by creating a collaborative environment that recognizes the unique skill sets that experienced science teachers have built over time.

### **Summary and Preview**

Chapter five highlighted the academic success of the WCHS teachers as well as their heightened levels of dissatisfaction with their job. Two highly qualified teachers were considering leaving the teaching profession, for reasons pertaining to dissatisfaction. Chapter six introduces four cultural myths that influenced the teaching profession in the four county region.

## Chapter 6

### **Exploring The Interactions Of Communities, Schools, And Science Teachers In The Rural Black Belt Region of Georgia: Highlighting And Dispelling The Cultural Myths Impacting Science Teacher Retention**

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<sup>1</sup>Hodges, G.W., Oliver, J.S & Tippins, D. (2010). *Unpublished dissertation, The University of Georgia.*

## **Exploring The Interactions Of Communities, Schools, And Science Teachers In The Rural Black Belt Region of Georgia: Highlighting And Dispelling The Cultural Myths Impacting Science Teacher Retention**

*This article, based on a qualitative, interpretive study of 10 science teachers and one administrator from the rural, Black Belt region of Georgia, presents the four cultural myths affecting science teacher retention in this area. The science teachers in this study each taught in schools identified as hard-to-staff, due to their location, student socioeconomic status, and demographic characteristics. Poverty rates within the four county schools surpassed state and national averages, ranging from 60% to 94% and over 70% of the students identified themselves as African Americans. This study utilized life history interviews, focus groups, semi-structured interviews, and document analysis to explore how and why teachers made specific career trajectory choices. During data analysis, four cultural myths that affected science teacher retention emerged: the myth of desegregation, rural teacher incompetence, accountability providing education equality, and teachers educating students to leave the community. Eight of the eleven highly qualified science teachers that participated in the study indicated varying levels of dissatisfaction with their job, five of which these tried to leave the profession in 2009. Implications address how individual schools may improve science teacher retention through understanding and debunking these myths.*

Staffing schools with qualified teachers receives vast attention from policymakers, researchers, and the public. Across the nation, 500,000 teachers leave their school annually, with 84% of the turnover due to attrition from the profession or mobility within it (Alliance for Excellent Education, 2008). For science teachers specifically, multiple reports including *Before It's Too Late*, from the Glenn Commission on Mathematics and Science Teaching for the 21st Century (2001), and *Rising above the Gathering Storm* (2006) have questioned the quality of

science education that students receive in the public school setting. Collectively, the reports called for staffing all classrooms with highly qualified teachers. President Obama recently identified the science teachers as the most important factor in determining whether or not students would achieve in school. He then tied the education students received to the health and safety of the nation (January, 2010). President Obama highlighted the importance of staffing each classroom, from urban to rural, north to south, with a high quality teacher to realize this goal. Currently, teacher turnover in science classrooms continues to rise, with 50% of science teachers leaving the profession within the first five years of teaching (Ingersoll, 2006). A review of the current scholarship on teacher retention and science teacher retention research (Ingersoll, 2009; Scafidi, 2003) has indicated that teachers who work in urban or rural settings that have a high percentage of poor students and ethnically diverse students are most likely to leave (Boe et al, 2008; Horng, 2009). However, this research does not answer *why* individual science teachers were compelled to do so.

A primary purpose of this study was to engage in an in-depth exploration of science teacher retention in the rural, Black Belt Region of Georgia. Rural education scholar Craig Howely asserted (2005), “the holy grail of rural education research lies.....in the flow of seemingly unremarkable everyday moments, where rural people make rural sense of, and with, their rural lives” (p.2). Accordingly, this study utilized qualitative methodologies to reach beyond the general characteristics, or *factors*, that researchers have correlated with science teacher attrition. The researcher walked alongside purposively chosen teachers over a nine-month timeframe, which began before “contract time”, to explore the tensions each individual faced while deciding his/her career path for the next year. Unlike many professions that require a two-week notice to alter career trajectory, teachers sign contracts that span one year of time,

which makes this decision paramount. The researcher explored science teacher retention within an underrepresented region of the state with an understudied student and teacher population by situating the study within predominately African American *rural* schools. Thus, the researcher privileged the actual teachers working in what researchers have named “hard-to-staff” schools.

Approximately one-third of America’s youth attended rural public schools in 2006 (Provasnick et al., 2007). Within the Black Belt region of Georgia, many schools, including the four within this study, were characterized by some of the highest rates of child poverty in the nation as well as high percentages of African American students (Provasnick et al., 2007; Save the Children, 2002; The Rural School and Community Trust, 2005). Statistically, these rural students dropped out of high school in higher rates, scored lower on standardized tests, and attended college in lower percentages than their urban and suburban peers (Brookings Institution, 2003; Provasnik et al., 2007). Researchers have correlated these findings with decreased curricular options, limited resources, and teacher shortages, which suggested that rural students were less prepared to transition to begin work or postsecondary education (Provasnick et al., 2007).

This study purposively sampled the science teachers within four contiguous rural schools, each of which served as the only public school option in the individual county. The researcher spent nine months in contact with the eleven science teachers, with the explicit goal of understanding their responses to career trajectory in relation to their individual contexts and the associated cultural myths. Kenneth Tobin (1996) asserted, “If cultural myths can be identified they can become foci for reflection, and if changes are deemed appropriate, they can be targets for change and potential catalysts for reform” (p.226).

## **An Understanding of Context**

### **The Rural Context**

There is consensus that rural schools present a unique context for schooling in comparison to urban and suburban schools (Arnold, 2005; Oliver, 2007), yet researchers have acknowledged the uniqueness of each individual school and community. Kathleen Budge (2006) demarcated common strengths and challenges that she believed cross the spectrum of rural areas, five of which were salient in the context of this study. Many rural areas are characterized by (a) low population density (Beeson & Strange, 2003; Oliver, 2007), (b) school and community interdependence (Oliver, 2007; Stern, 1994; Tippins & Mueller, 2009), (c) oppression as lived experience (Herzog & Pittman, 2003; Nadel & Sagawa, 2002), (d) outmigration of young talent (Farmer et. al, 2006; Nadel & Sagawa, 2002; Smith, 2003), and (e) a salient attachment to place (Farmer et. al, 2006; Howley, et al., 1996; Kemmis, 1990; Porter, 2001). Rural schools operate under the same laws and with comparable expectations and goals as their urban and suburban counterparts yet few scholars are studying rural education issues, and almost no funding is available to conduct education research in specifically rural contexts (Arnold, 2005; Sherwood, 2000).

### **The Black Belt Context**

Although the Black Belt lacks one prevailing definition, literature has suggested four historical uses of the term. The Mississippi Delta (Gotsch-Thompson, 1984), with the richness of the soil and use of the earth, has been cited as the inspiration for the name. Others (Bogie and Harrison, 1982) suggested that the term was utilized as a descriptor of the people who lived in the area. Odum (1934) stated that the Black Belt region is simply the old cotton states. Others

have quantitatively (Falk and Rankin, 1992) demarcated the area based on characteristics such as the number of African Americans that live within the area. Falk and Rankin defined the Black Belt as a region characterized by an African American population greater than 33%, a percentage that is three times higher than the national average in the United States. The Black Belt stretches from Virginia and Maryland, through the Carolinas and Florida, across Georgia, Alabama, Mississippi, Louisiana and Texas. In Georgia, this region stretches through 79 of Georgia's 159 counties, beginning at the border between Georgia and South Carolina, and continues southwest to the Georgia-Alabama-Florida border.

Educational scholar Jerome Morris (2009) contended that the "new south," popularized by the media does not exist in most southern, rural areas. Prosperous urban areas, such as Atlanta, Dallas and Houston characterized the "new south," while the rural areas lagged behind socially, politically, educationally and economically. Multiple researchers (Levernier & White, 1998; Webster & Bowman, 2008) have indicated through quantitative analysis that poverty rates in the Black Belt region consistently surpassed the rest of the state and nation. Economically and socially, the Black Belt region developed from the plantation economy where the cultivation of sugar cane, tobacco, and cotton for export and trade increased linearly with the increase in imported slaves. After the Civil War, the Blacks that remained were socially, economically, educationally, and politically disenfranchised due to Jim Crow laws that perpetuated racial divisiveness and unequal treatment (Duncan, 1996; Webster & Bowman, 2008). During the 1900s, the Southern economy began to incorporate service jobs as well as new industry. Those with more education and wealth emigrated, concentrating in urban centers, creating a highly developed infrastructure, as evidenced by *new south* economies. In the rural south, industry replaced agriculture, which brought forth lower paying, labor-oriented jobs in manufacturing

(Coclough, 1990). This concentrated poverty within the Black Belt region of Georgia.

According to Duncan (1996), African American citizens that chose to migrate out of the south often did so in search of increasing their economic potential, which further exasperated poverty by leaving people who were the least able to migrate in the worst economic situation.

In the 21st century, Black Belt poverty has continued to increase. Poverty in the Black Belt is 41% higher than Southern counties not located in the Black Belt. The per capita income is lowest in the rural Black Belt counties and the poverty rates are the highest (Falk and Ranking, 1992). When examining poverty geographically, researchers conclude that it is a southern, rural problem (Massey and Fischer, 2000; Webster & Bowman, 2008). Webster and Bowman (2008) utilized factor analysis based on the composite Black Belt characteristics derived from the literature to measure the demographic, social, economic, and political factors within each county. Their recent study indicated that each of the counties studied were part of an area that remained distinct from the rest of the state, with regard to the listed rates of demographic trends, poverty rates, health care issues, education attainment, and population growth. Compared to urban residents, rural residents have decreased work experience, more frequent job transitions, and higher rates of unemployment and underemployment (Jensen et al, 1999). Rural communities, as Edmondson (2003) pointed out in her ethnography of a Midwestern community, have undergone significant changes in the past several decades that require special attention.

Referring to rural areas in the United States as “The Rural American Ghetto,” Edmondson wrote:

Rather than realizing economic independence and prospering, rural residents too often find their main streets boarded up and corporate interests consuming their family farms, while federal policies increasingly work to serve the interests of large communities, large schools, large-scale farms, and agribusiness. (p. 23)

### **The Study**

This context provided a unique place to study three underrepresented groups of people in educational research (1) rural teachers, specifically (2) rural science teachers, even more specifically (3) teachers of African American rural students in towns characterized by declining populations (Census, 2007) due to manufacturing and construction decline (Gibbs, Kusmin, & Cromartie, 2005). The researcher worked at Five Points Charter School (FPCS) for three years, where she developed an appreciation for the unique and exceptionally difficult job of teaching in this rural place. Located less than 90 minutes from Atlanta, FPHS experienced exceptionally high teacher turnover, which affected the school, the students, and community. The researcher conceptualized this study with the explicit goal of understanding how and why teachers left the school as well as why others stayed. The researcher studied demographic data on surrounding counties, where she found three more counties that were similar in demographics and gained access to each through contacts within the university where she worked. Each of the counties studied were contiguous to FPCS. The students played each other in sports and many teachers had taught at other schools within the study. All of the science teachers from each school

participated in the study, excluding one science teacher from Gray County who said he did not have enough time.

Table 6.1

*Specific Demographic Information for Schools in Study*

School Name	School Size	Economically Disadvantaged Students	Student Demographics	Graduation Rate 2009	Teacher Turnover
Five Points Charter School	219	94%	95% African American	68%	35%
Gray County High School	536	77%	70% African American 30% Caucasian	75%	45%
Lorraine County High School	448	59%	65% African American 35% Caucasian	76%	35%
Wilson County High School	478	70%	65% African	89%	35%

### Methods and Analysis

This study employed an interpretive framework (Erickson, 1986) to collect and analyze the data set. Erickson (1986) described interpretive research as focusing on “the immediate and local meanings of actions, as defined from the actors’ point of view” (p.119). Accordingly, the researcher privileged the perspective of the science teachers, or the *actors*, within this context. The researcher collected individual and school data over a nine-month period, which began with the collection of life history (Goodson, 2006) interviews from each participant. The researcher constructed memos (Charmaz, 2006) for each participant, which highlighted areas of concern

that individual teachers discussed. Based on these preliminary findings, the researcher conducted focus groups at each of the four schools. Data collection and preliminary analysis occurred simultaneously, as the researcher conducted semi-structured (Patton, 2002) interviews with each participant, where she followed up on questions from prior interviews and focus groups. During the nine months, each participant took part in two focus groups and at least two interviews that lasted between one and two hours.

Secondary analysis occurred upon completion of the data collection process. The researcher completed a line-by-line transcription for each interview and focus group, while recursively coding each line of the data. Tertiary analysis involved collapsing the original 400 codes to 10 theoretical domains, which pertained to science teacher retention and attrition. The final analysis involved the researcher examining the ten theoretical domains for underlying cultural myths affecting teacher retention. During this portion of analysis, the researcher aimed to see whether any of these underpinnings were cultural myths, in the sense that teachers utilized them as referents. Other science education researchers have utilized a cultural myth framework to study student grades and teachers' time shortages (Brickhouse & Bodner, 1992), as well as reform implementation (Tobin and McRobbie, 1996). In 1991, Britzman studied student teachers, where she utilized the term *cultural myth* to describe the process by which student teachers constructed their vision of what teachers are and how they do their job. She explained:

Cultural myths provide a set of ideal images, definitions, justifications, and measures for thought, feelings and agency that work to render as unitary and certain the reality it seeks to produce. Myths provide a semblance of order, control, and certainty in the face of the uncertainty and vulnerability of the teacher's world. (p.222)

### **Findings: Exploring the Myths**

It is with utmost respect that the researcher presents the four cultural myths that science teachers identified as contributing to dissatisfaction. The researcher found multiple examples of each of the myths across all four counties, in most cases. When there is an exception, the researcher highlighted this disconfirming (Erickson, 1986) case and highlighted it for the reader as well. Only through long-term study of these places did the researcher begin to understand how these myths influenced science teachers and their subsequent career trajectory decisions.

#### **Myth 1: The Myth of Desegregation**

Unlike suburban and urban schools where school demographics mirror county demographics, each of the schools within this study significantly varied from the county demographic trends as evidenced on Table 6.2. When the researcher compared each county in this study to the state of Georgia, more people lived in poverty, the African American demographic increased, and the Caucasian demographic decreased. For example, an African American population of 59% characterized Five Points County, while the school surpassed 95%. Similarly, Lorraine County identified an African American population of 33%, while the school exceeded 70%. Collectively, an African American population that averaged 44% characterized the four counties, while the schools surpassed 76%, over 2 ½ times the average within the state of Georgia.

Table 6.2

*County and School Demographic Comparisons*

County Name	School Population	Population Percent Change from 2000-2010	African American County Population	African American Student Population	Caucasian County Population	Caucasian Student Population	Economically Disadvantaged County Population	Economically Disadvantaged Student Population
<i>Five Points</i>	219	-10.30%	59%	95%	64%	4%	27%	94%
<i>Lorraine</i>	448	-3.30%	33%	70%	66%	30%	18%	60%
<i>Gray</i>	536	8.50%	39%	75%	60%	24%	19%	77%
<i>Wilson</i>	478	-3.80%	42%	65%	57%	34%	22%	70%
<i>Averages for Four County Region</i>		-2.23%	43%	76%	62%	23%	22%	75%

Economically, each county poverty surpassed the state average (14%), but within the schools, the poverty was concentrated. For example, 94% of Five Points Charter School students received free or reduced lunches. Collectively, 75% of the students that attended these four schools received a free or reduced lunch, which surpassed the Georgia average by over four times. The population has declined in each county since 2000, excluding Gray County, while the state of Georgia experienced an 18% increase. County populations trended downward over the decade, ranging in decline from 3 ½ to 10 ½ %, excluding Gray County. Within Gray County, developers constructed Valley Lake, a premier resort area that attracted new high-end developments. However, the Gray County High School continued to decline in student population over the same timeframe, which indicated that the lake community did not send children into the school system. The above statistics highlighted the demographic trends of increased poverty and increased segregation, as the percentage of African American students attending the public school

surpassed 75%. As teachers discussed their frustrations with their teaching load and the associated course offerings, the significance of concentrated poverty and a desegregated school system on teachers' daily decision-making became evident.

**Teaching “white biology” at Wilson high.** The science teachers at Wilson County High School (WCHS) discussed their shared vision for learning, which included preparing all students for college. The science department implemented honors biology for freshman who chose to take the intense class. Jessica, the biology teacher explained their vision, “I enjoy the course because I feel like otherwise, I’m not challenging my really high students and I’m not helping my struggling students achieve their best. So, I like it, but it’s White Biology.” The department head, Mary continued, “Yes. We struggle with this because we only offer one section of higher math a year as well as one section of this honors biology, which tends to be all white. So we end up segregating the kids even more, but what should we do?” WCHS implemented a block schedule, in which each student took four courses a day and teachers taught three courses. Thus, WCHS, which employed only three science teachers, one of which taught only part-time for the department, offered only eight science courses last year, which constrained student choice to align with mathematics options. Collectively, the teachers at Wilson conveyed the importance of equity for their students during this conversation. Mary explained:

I do not know the right answer because each of our students deserve the options that other kids have. They should not be punished because they come from a small town. And colleges even base your admission on whether or not you take advanced placement courses. So, we want to implement AP Biology and AP Chemistry. But if we do this, it will take away other classes we teach or it will make our general classes overcrowded. And if it’s anything like *white biology*, it will hurt our more needy kids for the sake of the

ones that are doing better. Yet, those higher-level kids DESERVE to be challenged.

(Focus Group Interview, April 2009)

Mary highlighted a common theme throughout the schools studied. Within this four county area, only one school offered an advanced placement course in sciences: Lorraine County High School. GCHS and WCHS each taught on a four by four-block schedule, designed to provide teachers with 90 minutes of class time, which inhibited their ability to offer different courses. Thus, teachers at WCHS felt incapable of providing the education that students needed at their school. Moreover, each of the teachers at these schools prepared at least three different courses per semester, without offering advanced placement options. Table 3 highlights the number of teachers, preparations, and course offerings at each of the schools studied.

Table 6.3

*Number of Teachers, Preparations, Available Class Periods, and Course Offering Comparisons*

<b>School</b>	<b>Number of Science Teachers</b>	<b>Number of Preparations per Teacher/ Number of class periods per day</b>	<b>Offering Advanced Placement Courses</b>	<b>Offering Honors Science Courses</b>
Five Points	1	13/7	No	Yes (Taught in same class)
Gray	3	3 /4	No	Yes
Lorraine	3	4 /7	Yes	Yes
Wilson	3	3 / 4	No	Yes

WCHS teachers conveyed a need for advanced placement courses, but they explained that many needs were not met, due to the small teaching force. Jessica continued:

As much as I value science, it's important to recognize that there are no fine arts courses or even a chorus at this school, giving our kids no creative outlets. Yet we hammer home, you know, test after test after test because we're made to, but we're not funded to hammer home anything else. Our local infrastructure cannot support the arts and that sends a very powerful message to our students: this town is less valuable than the one next door. (Focus Group Interview, April, 2009)

Jessica brought forth the tension of students believing that their school and county does not value advanced courses, fine arts, and other “extra” courses, when financial constraints inhibited these valued courses. Prestigious lakes provided both Lorraine County and Gray County with a tax base that supported schools, which enabled these schools to offer extra courses. However, neither Wilson nor Five Points had the county wealth needed to implement courses outside of the prescribed curriculum. Students at the poorest schools ended up having the least amount of curriculum choices. Moreover, just to meet the minimum state requirements, science teachers were forced to teach an unfathomable amount of courses. The researcher found that problems influencing science teaching were symptomatic of the whole school system, in terms of desegregation, courses offered, and the tensions teachers experienced trying to negotiate the interconnected problems. This portion of data analysis provided the evidence for the first assertion: *Community attributes impact the decision-making process of rural science teachers.*

## **Myth 2: The Myth of Rural Teacher and Administrator Incompetence**

**The teachers.** Educational literature (Darling-Hammond, 2003; Ingersoll, 2006) has suggested that rural schools often hire under qualified teachers due to the difficulty faced with teacher recruitment. Within this four county study, the science teachers were highly qualified within their fields. Collectively, one hundred percent of the science teachers located in this four county region were considered highly qualified by the state. They averaged over 11 years of teaching experience and each had at least a master's degree in a natural science or education. Three of participants were pursuing a PhD in science education or administration. Collectively, five of the eleven science teachers were homegrown teachers and five more were raised in a rural area. These highly qualified teachers expressed dissatisfaction with the way they perceived the policy affecting their teaching as well as the role administrators played in their job. Nine of the eleven science teachers completed a science degree before adding on certification to meet the state requirements for teaching. Collectively, the science teachers within this study were exceptionally qualified to do their job. Within the administration, results varied.

**The administrators.** With the exception of Lorraine, which employed a former science teacher as the assistant principal, the teachers within this study believed that their administration did not understand how to support them or what their job entailed. Although each of the administrators employed met the requirements set forth by the state of Georgia, science teachers perceived them as adept at supporting their needs. The following analysis supports the second assertion warranted: *Former science teachers who transition to administration assess and encourage science teachers in ways that encourage retention.* James, a new teacher at WCHS, explained how the administration altered his job in order to offer more classes:

I taught business for three years at Glenn Oak High while I added on my certification in science. Wilson hired me to teach physical science and biology, but now they have changed their minds. I teach two sections of accounting in one block period, then I have to run over to the science building to teach one split section of physics, which has gifted and regular students in it, followed by a split section of biology. You tell me, when am I going to set up labs or create innovative lessons when I can't even go to the restroom between my classes.

(Interview, September 2009)

The administrators at Wilson High, which boasted a 96% pass rate on the Georgia High School Graduation Test, stripped the science teachers of preparation time and increased the class sizes for each science course. Mary explained, "Since we've gone from less than 50% passing to a 96% pass rate, these administrators think we can do it no matter what. They don't understand what it requires to teach quality science, and as long as they pass that test, they don't care."

Excluding Lorraine County High School, none of the science teachers experienced the appropriate amount of observations by administrators, due to their pass rates on the associated tests. Thus, teachers perceived student test scores as the only measure of job performance. Moreover, eight of the eleven teachers within this study described administrators as incompetent, lazy, or part of a "good old boys" club. Jessica, who was pursuing her PhD in science education during this study articulated:

I think what is most disappointing about my doctoral work is listening to everyone talk about escaping teaching. I teach because I love it and went back to school to get better at it, not to escape the classroom. I'm beginning to believe that administrators are just people that are either money hungry or they hated teaching. My administrators were not

good teachers when they did teach and I think that's wrong. If you're going to manage teachers, you should know what you're doing. (Interview, April, 2009)

At WCHS and GCHS the principals and the assistant principals had taught mathematics or social studies for over 15 years before the counties promoted them to administration. Neither science department felt that their administration understood science teaching or respected the difficulty of the job. Instead, science teachers perceived administrators as lazy and incompetent. At Five Points, the county employed three different principals over the three-year time span that the researcher worked there. The science teachers, each of whom knew her personally, perceived Ms. Bivins, the current principal, as hardworking and competent. Dexter explained, "Ms. Bivins doesn't understand science, but she does her best to support us in any way she can. All we have to do is ask for a supply or anything else, and she finds a way to help us." Teachers at Lorraine County High School, the only school in the study that employed a former science teacher in an administrative role, described their administrator as affecting daily change in their practice.

### **The Special Case of LCHS**

Two years ago, LCHS hired a former science teacher to serve in the position of assistant superintendent. Raised in Lorraine County, Brandon worked in a suburb of a large, metropolitan city until Lorraine "called him home." He decided to return to serve in Lorraine due to his belief that he could invoke change in a "stagnant school." He explained:

Where I was working, things were going well. Back home, I saw serious issues with the education kids were receiving, especially in science. I knew for a fact that teachers weren't teaching labs and I knew that they weren't using inquiry or aligning with the standards. So, I spend my days in the classrooms, helping science teachers, scaffolding them so that they can teach the way they should. (Interview, February, 2009)

Science teachers at Gray, Five Points, and Wilson conveyed that administrators only focused on the test scores of the students within their department. As long as test scores indicated success, science teachers were perceived as successfully fulfilling their role. None of the science teachers at the schools received the required number of observations by administrators. Some teachers felt that this was due to the administrator's belief that they were exceptional teachers. However, others took this as another indicator of incompetence. When asked about returning to his hometown in the role of an administrator, Brandon indicated that, due to the location of Lorraine, staffing positions posed difficult challenges that he aggressively approached:

It's difficult here, because it's so hard to get teachers to come and work here, so I'm doing everything I can to make sure they have access to any professional development they want to attend. I write grants to get them more materials, and I try my best to listen to my science teachers and create an environment where they do not have an inordinate amount of preps and they have the supplies they need so that they can focus on teaching such a diversity of learners. (Interview, February 2009)

At LCHS, science teachers were valued and experienced different expectations than those at the other schools. Hailey explained:

Over the last two years at LCHS, things have changed in this department. Brandon comes and talks to us about what we need and he expects us to implement labs and teach by the standards. I know that he's on my side and that he wants what is best for the kids and for me. If I need something, he gets it for me- no questions asked. He asked me to join the leadership team at the school, so I now understand what's going on and I have input into county-level decisions. There's no way I'm leaving this school! (Interview, February 2009)

At LCHS, science test scores surpassed the state-level averages. However, when asked about the science teachers at LCHS, Brandon explained that only one teacher, Hailey, taught in a manner that he believed challenged students and aligned with current national standards:

If I could recruit new teachers, I would fire two that are currently here. I am doing my best to help the other two teachers step it up, in terms of how they teach and how they treat their students. For the last eight years, the lab area has had serious issues, in terms of things breaking, so they have stopped doing labs! Many of our students haven't done labs in eight years because of the facility and two of my teachers don't care. They like teaching here and they can make the kids pass a test. That's just not enough. Have you seen the tests? Anyone can teach kids to pass that low-level assessment. I want more.

(Interview, May 2009)

Unlike the administrators at the other schools that felt their teachers were successful, based on test scores, Brandon assessed his science teachers on more than standardized test scores:

I have analyzed the standardized test data, and some of it is very valuable. However, this cannot serve as the only indicator of a job well done. This data has shown me some very important demographic variables and I have discussed these trends with my teachers. But, I will not allow my students to be taught by teachers that have only one goal for them, one that aligns with a test. I want more. (Interview, June 2010)

Until Brandon began supervising the science teachers, the administrators observed teachers' classroom management styles and test scores only. Brandon added the expectation of teaching the tenants of science, which irritated both of these seasoned teachers. Jason explained, "I've been doing this for 18 years, and I do it well. My job is to get kids to do well on those tests, not

to entertain them with activities: they're in high school now!" Brady and Jason, the two other science teachers at LCHS individually expressed the sentiment of continued conflict with Brandon. Brady explained, "Brandon is always coming into our room and asking us about labs and standards alignment. My student scores are above the state average; that should be enough for him."

### **Myth 3: Accountability Improves Educational Equity**

The third assertion discussed in this analysis states: *Current Accountability measures mask unequal educational opportunities within rural schools*. This portion of analysis begins with the tension caused by schools that task one teacher with multiple science preparation. Next, results that highlight inequity of accountability in this place are discussed.

**The case of one science teacher at FPCS.** Often science teachers in rural areas are tasked with teaching more class preparations than suburban or urban educators. In spite trends in preservice education programs that suggest needed expertise in a science discipline in order to teach it, in rural areas, teachers may teach outside of the area of expertise. For example, at Five Points High School, Amy served as the only science teacher for the whole high school. Raised in Five Points, Amy began teaching on a provisional certificate nine years ago. During her ninth year, she expressed satisfaction with her job, her school, and her community. She explained:

We work hard here. All of us do, but we have the support to do what we need to do to help our kids learn. Now, when we opened this school, it wasn't that way. We had kids that were allowed to sleep in class and drop out when they attended Gray County. Now that we've had them home for nine years, it's a different school. I've taught all these kids

all the science they've learned at school, so I know what they know and I know what's hard for each one of them. (Interview, June 2009).

Amy taught thirteen different courses during the 2008-2009 school year, many of which occurred simultaneously. She explained:

I know that it sounds impossible to teach all of those classes, but my classes are small, 12 students is the largest class I've had since I taught middle school. So, I try to individualize my instruction for the kids and whenever I set up a lab, I find a way for it to relate for all of my students. And, it sounds like I have more preparations that I do because I do not make any difference between honors classes and regular classes. I teach them at the same level (Interview, June 2009)

Unlike larger schools that offer differentiated coursework, the students at FPCH received the same coursework, regardless of interest or ability. Students' science schedules were constructed by the teachers, since there were no electives from which to choose. Moreover, students had no variability with the teacher, either. Amy began teaching in Five Points in the middle school, serving as the only science teacher at the middle school level for three years before transitioning to high school. For some graduates of the Five Points system, Amy has served as students' only science teacher from middle school through high school. For the remainder of the students, she has served as the only science high school science teacher. Likable and respected, Amy identified herself as a role model for students, conveying the importance of education her life. She continued, "Since I have been their only teacher, I know what they know and I know what they don't know, so I can make sure they pass those high stakes tests." For the

last six years that Amy has served as the science teacher for the high school, test scores have trended upward in the sciences.

**Test preparation mania.** In 2008, over 85% of Amy's students passed the Georgia High School Graduation test in sciences, supporting her assertion of improved learning. However, none of her students has experienced elective coursework in ecology, zoology, anatomy and physiology, or any advanced placement courses. However, the state of Georgia named Five Points an exceptional school, due to their improvement on the standardized test. Moreover, each of the schools studied have employed a preparation course for the science portion of the graduation test. Students at each school were given a predictor test at the beginning of their junior year that was designed to identify students that would not pass the graduation test. At each school, 100% of the students that failed this test were required to take a course to specifically prepare them for the graduation test. Although each school individually designed the preparation course, the courses were similar in nature. They required students to complete test preparation materials, which consisted of constructing note cards, answering questions for test preparation manuals, and reviewing as a group. Students who took this course spent 25% of their class time for a whole semester prepping for a test, if they attended a school that utilized a 4 by 4-block schedule. In seven period schools, the course lasted the whole year, one period a day, or approximately 15% of their coursework for the year. This vast amount of time was in addition to test preparation that all students received at each of the studied schools.

**Test prepping all students.** One hundred percent of the schools studied reported that they were required to complete test-preparation every day during the school year. Carrie explained, "I just use test questions as bell ringers every day so that I'm covering that test every day." Similarly, Jason explained, "We have a test review book that we do a page out of every

day, just to get them thinking how the questions are asked on that graduation test.” For the two weeks leading up to the graduation test, all of the schools suspended regular teaching in order to prepare students one more time. Mary explained, “We organize two solid weeks of review for everyone so that they are ready for that test, we review it all in two weeks.”

Carrie, the most experienced teacher in the study explained her feelings regarding accountability.

Accountability has completely reshaped my goals for my students. Before, I wanted my kids to love science, to be fascinated with science, realize how amazing the human body is and how amazing nature is. We used to do some of the coolest, funnest stuff, you know, when I didn't have a test to teach- now I gave tests, but I didn't have a state test that, you know, they had to pass you know and I'm afraid that I've, I've done exactly what all these education people say we shouldn't do. You know, I've learned that you got to, they've got to pass that test so I've tried to teach that test. And it's so different. I've talked about this to old teachers before. I used to truly enjoy every day. And now I enjoy the moments when I see them learn, but I don't truly enjoy every day because I know I've got that test looming. LOOMING. And I honestly think that if I could take that test for them, I'd do it! But that's not good; that's probably not a good answer. (Interview, May 2009)

Carrie continued to explain how she felt as though she had “sold out” to the test. She continued, “I just do not understand why no one values what I have to say about what my students have learned.” One hundred percent of the teachers studied indicated that accountability measures affected their daily teaching. Carrie, an excellent, experienced science teacher indicated that the pressure she felt in relation to the test was unparalleled in relation to any of the other 30 plus years in which she has taught. As indicated by Carrie, current accountability impacted these

teachers in manners unprecedented, affecting satisfaction. When contrasted with the experiences of new teachers, the affects of accountability were magnified.

**Test Prepping viewed by a novice teacher.** The following assertion, *Standards and accountability measures alter new teachers' practice to the extent that they migrate to a new school or leave the profession*, emerged through data analysis of the two new teachers that participated in the study. Brittany, a new teacher that completed a master's degree in Marine Sciences before adding on certification explained her perception of the curriculum that guided teaching at Gray County:

I am a rule follower. I make a plan and I stick to it. That's why I enjoyed working in a lab so much. But I am struggling because these standards do not teach what I think it the most important information about the subject. I feel very torn between teaching what the standards tell me to teach and teaching what I believe is important to understanding marine life. (Interview, February 2009)

Although Brittany had exceptional expertise within the area in which she taught, she felt constrained to align with a curriculum that did not address what she believed to be fundamental components of the discipline. She continued, "I chose to teach because I wanted to use my expertise to get them interested in science, that's what I did my undergraduate students that I taught. I guess high school just isn't focused on that." Brittany, who taught two courses in her expertise felt constrained to teach concepts that she believed were less valuable for her students to learn, in order to align with the prescribed curriculum. One year later (February 2010), Brittany has decided that she will not return to Gray County. She explained, "I thought I could stay here and teach, but I have got to go somewhere else where they will let me teach what I want to teach, how I want to teach it." Brittany related the constrained curriculum to the

particular context, as did Dexter, the other new teacher.

Dexter began his teaching career at Five Points Charter School, where he taught all of the middle school science. Dexter explained, “This was not my first choice of places to teach, but it has been fine. However, I am going to transfer to a school closer to Atlanta where I can teach without so much red tape.” Since the middle school in Five Points failed to make adequate yearly progress during the 2007-2008 school year, a specialist from the state examined his lessons plans and changed them, based on the Georgia standards. “I understand using standards, but I think there is more to science than what they specifically require and I don’t like someone telling me exactly what to teach.” Each of these highly qualified new teachers planned to migrate to more urban and suburban areas, because they believed that they would experience more freedom in these areas. Brittany continued, “I want to teach somewhere that offers challenging courses that teach students to think like scientists, not how to bubble in answer sheets.” (April, 2010).

One hundred percent of the teachers within this study conveyed disappointment with the current course that they believed education was taking. Jessica explained, “I am an intelligent, hard-working teacher whose job continues to morph into one of a paper pusher instead of an educator.” Collectively, teachers altered their teaching to align with the curriculum standards that determined students’ success, which left teachers feeling undervalued. Jason explained, “Our profession continues to tell us we are incapable of assessing or implementing anything of value.” During a focus group on accountability, James explained:

There is this idea that you can do whatever you want if you teach at a rural school, but that is not true. Our test scores make the front page of the newspaper here and everybody knows who teaches what. When you only have 60 students taking that test, every score counts. So, a few kids failing that test makes our whole system fail. Not to mention what

happens to that individual child that receives a certificate of attendance instead of a diploma (Focus Group Interview, April 2009)

**The intersection of accountability and equity.** Students that were required to take test preparation classes were over 90% African American across all four school districts. While the students who were less successful at taking a standardized test practiced, the other students took elective courses that they chose. However, policymakers have noted a “closing of the achievement gap” at these schools, one of which was selected as a state exemplar because of this. In spite of the fact that none of the teachers in this study believed the test preparation class was valuable for lifelong learning, each acquiesced, due to their understanding of the testing serving as a gatekeeper. Although this study did not look at the popularized achievement gap, educational scholars (Ladson-Billings, 2006; Zhang & Cohen, 2009) and policymakers (Obama, 2008) continually discuss the discrepancies found between African American students and White students on achievement tests. For example, President Obama (2008) stated:

We do not need to recite here the history of racial injustice in this country. But we do need to remind ourselves that so many of the disparities that exist in the African-American community today can be directly traced to inequalities passed on from an earlier generation that suffered under the brutal legacy of slavery and Jim Crow. Segregated schools were, and are, inferior schools; we still haven't fixed them, fifty years after *Brown v. Board of Education*, and the inferior education they provided, then and now, helps explain the pervasive achievement gap between today's black and white students. (p.5)

In the name of equity, policymakers have implemented assessment and accountability measures aimed at ensuring that all students achieve in public schools. However, the science teachers in

this study indicated that the policy mandates oversimplified the problems that affected their teaching. Resources in *this* place were limited to the extent that teachers found providing all students with an appropriate science education impossible, regardless of awards received due to improvement on standardized tests.

Nine of the eleven teachers that participated in the study cited feelings of deprofessionalization as a reason for leaving the profession or their individual school context. However, nine of the eleven teachers continued, signing their contracts, due to their dedication to the students. These teachers shared a vision for their students that surpassed simply teaching science. Nine of the teachers cared deeply for their students, advocating for them educationally, teaching with purpose, while understanding the area in which they lived. When the researcher asked teachers to describe their goals for students, nine of the eleven began with abstract notions of success that eventually articulated as the ability of students to make choices.

#### **Myth 4: Teachers in rural areas only perceive *students leaving* as successful**

In an earlier study, the researcher analyzed the actions and goals of each of the teachers within this study, which highlighted a strong social justice agenda that motivated many of the teachers. Specifically, teachers articulated the social justice component of their job as consisting of “teaching for the freedom of choice.” The fifth assertion highlighted in this analysis explains: *teachers advocating for educating out of the community aimed to provide the most choice for students while enriching the local community*. Jennifer explained, “I want all students to have choices. I’m not in the business of trying to decide what children should do the rest of their lives. I’m in the business of giving them choices.” Mary added:

Life is not fair, but I believe these kids can learn to use the power that education provides to do whatever they want in life. I did. They must understand the rules that run our

society. When my Black male students ask me why I expect so much from them, I tell them because they are capable. I then tell them that researchers use statistics based on fourth grade Black males to determine how many prison cells to make. You ask me what my goals are, I want these children to have the freedom to do what they want, but understand that their road is longer. (Interview, May 2009)

Eight of the eleven teachers studied identified social justice goals guiding their practice, where they explicitly taught the power of education. Mary, an African American female, recalled her parents support for desegregation in Wilson County. She told the researcher how neither of her parents graduated from high school, but yet believed that education could improve race relations and open economic doors for their children. Each of the participants that expressed a strong social justice agenda had similar stories of education opening doors for them; none of them were from affluent or highly education families. All of the teachers in this study believed that educating students to leave the community provided the most options for students and allowed for improvement within the county, by default. None of the towns studied has colleges within forty miles. Without leaving for school, job choice was limited to those that did not require any higher education. All of the homegrown teachers explained a transition in job availability as well, a change that now required a high school diploma.

Regarding a high school diploma, Jason explained, “These kids just don’t have the job opportunities that their parents had in the mills. Their parents didn’t need a high school diploma, necessarily, because they could earn a living without it. You tell me, what can they do, nowadays, without one? It’s a gatekeeper.” One hundred percent of the teachers indicated that all of their students needed a high school diploma in order to provide for themselves and a future family. In order to maintain what teachers referred to as “freedom of choice”, teachers explained

the need for students to leave the community. Teachers described one successful outcome as “educating out” of the community to pursue higher education, either at a technical school or a four-year institution, which prepared the individual for a job that the home community could not support.

Advocates of ‘educating out’ explicitly taught students to give back to their hometown by bringing a business back to the community or returning on the weekends for special occasions to mentor youth. These experienced teachers stressed the notion of “educating out and giving back” due to the limited educational and economical options available within the community. Pat explained, “As much as I would like to say that kids have ample opportunity here, let’s face it, there are no colleges or technical schools here. So I do not see how we can advocate that kids should stay here and not get to follow their dreams. How is that helpful?” Success involved “educating out and giving back” to the place in which the student was raised.

**Educating out, giving back.** Policies such as *No Child Left Behind*, constructed to provide equity within education, have perpetuated each of the myths highlighted in this study. By utilizing standardized tests as the only indicator of success within schools systems, teachers have implemented measures, such as drastic test preparation to ensure that all students pass a test. Teachers such as Mary described their work in education as a two front war:

You see, I combat the social ills of schooling from two directions. I do whatever I can to help each individual child succeed. The other way I combat the issues is by educating my community. You see, I can only do so much during the 90 minutes a day I see these children, but I can change lives by educating their parents. (Interview, May 2009)

Mary explained how she and five others have challenged their church community to ensure that every child graduates from high school. They have implemented a monitoring system during the primary years, where they listen to each child read during Sunday School. She explained:

When we realize a child isn't reading on level, we call the parent out and talk to them about what's going on at home and at school. A lot of these parents are young, uneducated, and scared of the schools because the schools beat them up. We tell them what questions to ask the and how to ask it. We often accompany them when they go meet with a teacher. (Interview, October 2009)

Mary and her friends, each of whom went to WCHS during desegregation, moved home within the last eight years and have dedicated countless hours to educating parents:

We have parties for the students when they succeed and we meet with parents after church before school starts to tell them to join PTO and get to know their students' teachers. If we really want to change opportunities, we have to change the teaching and learning experiences of these children and their parents *now*. (Interview, October 2009)

Mary explained that over the last eight years, 100% of the students from her community church have graduated, even though it took some three extra years. "We make sure they have pencils, pens, and clothes to wear, because any child deserves this."

Collectively, the science teachers highlighted four main indicators of success for their students: a high school education, choice with employment opportunities, family involvement, and community involvement. These teachers envisioned powerful teaching, powerful learning, yet they believed that the policymakers or the administration did not value their ideas.

Two of the science teachers in the study were first year teachers, each of which attended

four-year universities prior to beginning their careers in rural towns. Both Brittany and Dexter conveyed deficit views of the towns where they now taught. Rural scholars Howley, Theobald, and Howley (2005) explained, “an ignorant mainstream, in fact, routinely presumes that rural schools (and cultures) are deficient, almost necessarily so. The rural outlook on living well is so different from the mainstream (suburban) norm that it is vilified and romanticized, and rarely understood or authentically appreciated by outsiders” (p.5). Dexter and Brittany, were raised in affluent, suburban areas, expressed the need to educate out of the town because it lacked restaurants, industry, entertainment, and colleges, which would limit their choices. Neither understood why anyone would want to stay.

### **Discussion**

The purpose of this study was to inquire into the day-to-day tensions that science teachers experienced that led to turnover. The researcher situated the study in poor, rural schools, where African American students were the majority. The teachers conveyed broad problems within their school system, such as segregated classes, lack of class choice, and the implementation of accountability measures within each school. However, teachers were unwilling to sacrifice the opportunities of individual students, as evidenced by teachers as they negotiated standardized testing. Teachers felt compelled to ensure that their students passed the GHSGT, due to the tremendous life impact wielded by failure. In the state of Georgia, students that failed the science portion of this assessment received a certificate of attendance instead of a diploma. Mary explained, “It humiliates children who continue to fail this test. It tells them, repeatedly, that they are not smart and they do not deserve a better life. So I teach them how to pass that low level test.”

Policymakers must understand that schools cannot remedy economic discrepancies and

educational debts that some students experience. When policies judge the effectiveness of teachers based on one indicator, they minimize the job of a teacher to one of a trainer. Can teachers train children to fill out a test? If so, the school, the students, and the teachers are deemed functioning schools. This oversimplification of teaching as the ability to successfully train students to perform on a test has altered the teaching profession into one that many fail to recognize as the profession they chose. Rather, this study suggests that science teachers want to invoke change in the lives of their students. They want to teach them science, in meaningful ways that research has proven works, yet they feel stifled, bounded, due to their undergirding principal of teaching for freedom and choice. In order to invoke change within any school or district, policymakers must understand the individual school and community dynamics. The most efficient way to do this is to ask the actual teachers. What do the teachers in *this* place desire? Science teachers in this study desire:

- their students to have access to advanced courses without harming any students
- to have the freedom to teach in a manner that aligns with the national standards, which they understand
- to be held accountable for their job by measures other than a standardized test
- to feel respected for the job they do

## **Implications**

### **Catalysts for Reform**

Nine of the eleven highly qualified science teachers that participated in this study indicated that dissatisfaction could lead them to leave the profession. Within this particular

context, four cultural myths affected teacher satisfaction: desegregation, rural teacher incompetence, accountability providing educational equity, and teachers educating students out of the community. Understanding of the four cultural myths, helps to explain why teachers make individual career choices as well as daily decisions within their classrooms. The blanket policies, such as those prescribed in order to schools to make adequate yearly progress, are based on quantitative data that transform schools and students into a set of numbers, instead of individual students and teachers within a unique context. In Five Points, Gray, Lorraine, and Wilson Counties, the blanket policies set forth to achieve equity have resulted in increased student segregation, decreased higher level learning, and immense teacher dissatisfaction. Rural scholar Farmer explained, “There is an implicit understanding that the growth and development of rural communities is inextricably intertwined with the education of the children” (2006, p.9). To improve the quality of life in *these counties*, schools must thrive. When asked, science teachers in the four county schools delineated three school level initiatives that would improve teaching and learning:

- Student Needs: Teachers suggested two main additions to schools. First, a career development center, which most high schools house in a counseling department. This could offer students exposure to career options and college options, while assisting students with the paperwork required to apply for jobs or financial aid. Many of these students do not have parents that know how to fill out the complex paperwork associated with financial aid forms and college applications, which teachers believed limited many from even applying. Second, students lack the course options that could open their eyes to careers and excite them about learning. This crosses all disciplines, as highlighted by the dearth of fine arts programs within this region.

- **Teacher Needs:** Teachers need the ability to teach the courses they believe will improve student learning and interest. For example, in the sciences, the teachers want to teach advanced placement courses, environmental science, anatomy, as well as zoology and marine sciences. Second, teachers need accountability that assesses the job they perform, which one standardized test does not duly achieve.
- **Structural Changes:** Small, rural schools need to implement a seven period day in order to provide students with time slots to take the courses needed. The small schools within this study that utilized a four by four block increased student segregation and limited course options.

The researcher neither claims nor desires generalizability from this research study. Rather, the researcher sought to provide a picture of teaching in the counties studied, from the perspective of the teacher. As Blunk et al. (1995) stated, “Science education in rural settings may be able to provide the most conclusive and useful examples of successful reforms due to the ability of personal experiences to drive knowledge exploration in real life contexts” (p.90). As evidenced here, students “achieving” on a standardized test, or “succeeding” in the eyes of the state and nation hides the realities of the health of school systems. In depth, individual study of the four districts revealed that within each school system, the county, the teachers, and the community were inextricably linked. Simply altering one policy or implementing one change will not magically create a school where teachers stay and students succeed.

### **Summary and Preview**

Chapter six highlighted four cultural myths that influenced science teacher retention across the four counties studied. This chapter illuminated the interconnectivity of the communities and the studied schools. Chapter seven begins with the assertions presented during chapters four, five, and six, then overlays the assertions with the cultural myths that influenced the assertions. Together, the cultural myths and the assertions generated have a dialectic relationship, which further supports the assertion of the interconnected relationship between small, rural schools and the schools located within them.

## Chapter 7

### Synthesis and Implications

The purpose of this study was to explore the tensions impacting the career trajectory of science teachers in the rural, Black Belt region of Georgia. The researcher utilized an interpretive methodology (Erickson, 1986), due to her belief that current scholarship has generally failed to study the tensions impacting career trajectory, due to the focus on breadth instead of depth. The questions that guided the study were:

1. *What tensions do science teachers experience regarding career persistence in rural schools?*
  - a. *How are these tensions associated with professional dimensions of rural science teaching?*
  - b. *How are these tensions associated with personal dimensions of rural science teaching?*
  - c. *How are these tensions associated with contextual dimensions of rural science teaching?*
2. *Within the context of this study, what implicit or explicit cultural myths impact science teacher retention?*

To address the first question, the researcher first bounded the study to four counties located within the Black Belt region of Georgia. After working as a graduate student for three years at Five Points Charter School (FPCS), the researcher felt compelled to examine more schools within the region due to her experiences with teacher turnover at FPCS. Did other schools experience similar rates of turnover and similar difficulties with teacher recruitment? Through

exploration of census data as well as input from major professors, the researcher identified three additional counties to study, due to their similar demographic makeup. Within this four county area, ten science teachers chose to participate as well as one assistant superintendant. All of the science teachers in the four county schools participated in the study, excluding the department head at Gray County, which provided eleven primary participants. Each participant completed a demographic map, which gathered personal demographic information from each teacher. Next, each participant completed a life history interview (Goodson, 2006) that aimed to understand *who* was teaching in the region as well as *why* they chose to teach at their individual school. The second phase of the study included two focus groups interviews with each science department and multiple semi-structured interviews for each participant.

Collectively, the life history interviews, semi-structured interviews (Patton, 2002), as well as participant observation and the researcher's field note journal, were used to address the research questions. Due to the type of data collected, it is impossible to completely separate data collection methods to align with only one research question. Participants discussed different dimensions of each of the research questions throughout the nine-month process.

The tensions that emerged across each of the schools were analyzed using Erickson's (1986) methods for generating assertions. In the previous chapters, results from the study were used to indicate the identifiable tensions affecting highly qualified science teachers' career trajectories. These tensions emerged across each of the schools. As revealed by the analysis of the generated assertions, most of the personal, professional, and contextual tensions that impacted the career trajectory of science teachers lacked an easy "fix." Instead, science teachers grappled with multiple personal, professional, and contextual tensions that collectively shaped their career decisions.

## Discussion

### Who left? Who Stayed?

During the 2008-2009 school year, the four county schools studied lost only one teacher, which, on the surface, indicated that retention issues were not impacting science teaching. If this study only examined attrition statistics, the more perplexing problems affecting this area would have gone unnoticed. Through the in-depth examination of the science teachers, a different, more problematic picture of who planned to stay and who planned to leave emerged.

During the 2008-2009 school year, the state of Georgia, as well as the rest of the nation, entered a recession that significantly affected the ability of teachers to change jobs. Although four of the eleven teachers sent their resumé to different schools or other corporations, only one teacher ended up leaving; ironically, this teacher was an individual who did *not* want to leave. Dexter and Brittany, the two novice teachers who participated in the study, each signed his/her contract. Neither Dexter nor Brittany migrated to different schools. Each sent their resumes to suburban districts that surrounded Atlanta, closer to where their fiancées lived. Dexter explained, “It’s much easier for me to find a job around Atlanta than for my fiancée to find a job here, plus I would not want to raise a family here.”

Table 7.1

*Career Decisions Made by Teachers and Administrators*

School System and Teacher	Teacher wants to Stay at School	Teachers Receiving Unsatisfactory Observations	Teaching Experience (In Years)	Retention Rates
<b>Five Points</b>				
<i>Amy</i>	Yes	No	8	100%
<i>Dexter</i>	No	No	1	
<b>Gray</b>				
<i>Brittany</i>	No	No	1	75%
<i>Carrie</i>	Yes	No	33	
<b>Lorraine</b>				
<i>Brady</i>	Yes	Yes	10	100%
<i>Jason</i>	Yes	Yes	30	
<i>Hailey</i>	Yes	No	10	
<b>Wilson</b>				
<i>Mary</i>	No	No	8	100%
<i>Jessica</i>	No	No	6	
<i>James</i>	Yes	No	3	

Brittany conveyed similar notions, and then explained that she just wanted to teach somewhere similar to where she grew up. “My fiancée loves where he lives, and the way he describes it, it sounds like a place where they value education more than they do here. There’s nothing tying me here, so I’m trying to get out.” Mary and Jessica each decided that they would give their school system one more year, although this decision, too, was affected by the lack of jobs available.

However, Carrie, a highly qualified, experienced teacher of 33 years, did not receive the offer of a contract, because she was the “last hired” at Gray County. Gray County lost a teacher who focused on providing a high quality, equitable education to each student in her classroom. She knew her content as well as her students’ needs, yet, due to her lack of seniority at the

school, she did not receive a contract. Eventually Carrie found a job in a nearby district teaching middle school science. She explained, “middle school isn’t my strong suit, but I’m thankful to have a job.” Finally, due to the difficulty that Lorraine County High School (LCHS) experienced recruiting new teachers, the school system retained two science teachers who had not been evaluated highly or even satisfactorily. Brady and Jason were each offered a contract, in spite of multiple unsatisfactory observations by the principal and the assistant superintendant. Each of these teachers received multiple negative observations, and neither provided instruction to their students that included laboratory activities during the school year. Brandon, who was responsible for hiring in the district explained, “I have been looking for replacements for months and I cannot get certified teachers to even interview.”

During the 2008-2009 school year, attrition rates for science teachers in the studied schools showcased an exceptional retention rate of 90%. Moreover, each of the science teachers that participated were considered highly qualified by the state of Georgia. However, as the inquiry deepened, multiple interconnected tensions emerged that presented a different rendering of the health of the science teaching profession within these schools.

### **A Summary of the Assertions**

During analysis, the researcher distilled the data into ten assertions, as well as two overarching assertions. The researcher grouped the assertions according to their area of focus, creating a framework for chapters four, five, and six. Each of the chapters prioritized the assertions related to one of three overarching domains of inquiry that directly or indirectly affected teacher retention: contextual dimensions, deprofessionalization, and cultural myths. Chapter Four focused on *how* individual teachers negotiated their school setting. Analysis of

novice and experienced teachers perceptions of the same school context provided the evidence for the following assertions:

- Assertion I: New teachers construct deficit views of students, schools, and communities when they feel isolated and overwhelmed.
- Assertion II: Experienced teachers continue to make novice teachers attempt the most difficult job in the department, keeping the easier jobs for themselves
- Assertion III: Advocating for counties to “grow their own teachers” may perpetuate myths of rurality and rural people

Chapter Five explored Wilson County High School, a place that emerged as an exemplar in the four county region. Wilson County High School achieved one hundred percent retention of the science teachers over the last eight years while concurrently increasing graduation rates from less than 50% to 89%, due to an increased pass rate on the science portion of the Georgia High School Graduation Test. The assertions detailed during Chapter Five included:

- Assertion IV: Collectively constructing a vision of appropriate student learning goals as well as teacher responsibility by the individuals within a school science department contributed to persistence
- Assertion V: Deprofessionalization leads science teachers to consider and possibly pursue alternative employment

Chapter Six highlighted findings that pertained to the cultural myths influencing science teacher retention, which explicitly addressed the second research question. During chapter six, the researcher addressed assertions six through ten in relation to the cultural myths illuminated during the study.

- Assertion VI: The location, people, and resources available within a community influence the decision-making process of rural science teachers
- Assertion VII: Science teachers who transition their careers into administrative roles assess and encourage other science teachers in ways that support retention
- Assertion VIII: Current Accountability measures mask unequal educational opportunities within rural schools
- Assertion IX: Standards and accountability measures alter new teachers' practice to the extent that they migrate to a new school or leave the profession
- Assertion X: Teachers advocating that students leave the community aimed to provide the most choice for students while enriching the local community.

The literature base concerning science teacher career trajectory was outlined in Chapter Two. Collectively, previous research continually asserted that the demographic characteristics of students influenced the career trajectory decisions of teachers (Ingersoll, 2001; Murnane, Singer, & Willett, 1981). Scafidi, Sjoquist, and Stinebrickner (2003) highlighted this trend in the state of Georgia, where they analyzed data from the National Center for Educational Statistics to assert that the student demographic variables of race and socioeconomic status provided the best explanation for teacher career trajectory decisions. By situating this study in the Black Belt region of Georgia, the researcher was able to study the career trajectory of science teachers who taught African American students that lived in one of the poorest region of Georgia. The assertions generated from this inquiry differed from the results of many other researchers (Hanushek, 2004; Scafidi et. al, 2003). None of the science teachers who participated in this research either implicitly or explicitly cited demographic characteristics of students as influencing their career trajectory. Instead, overlapping and seemingly irresolvable tensions

affected their career satisfaction. Ultimately, these tensions led four of the ten teachers to pursue employment outside of their school context for the next school year. The following discussion highlights the overlapping nature of the assertions generated through data analysis.

### **Interconnectivity of the Assertions**

Analysis of the data generated ten different assertions that addressed science teacher retention, attrition, and migration. The ten assertions were then utilized to construct two overarching assertions. Figure 7.1 highlights the interconnectivity of the generated assertions and indicates how the assertions directly relate to the cultural myths within this study.

Assertions four and seven offered insight into how schools may improve teacher retention. Assertion four highlighted the impact of a strong leader in the role of department head. Utilizing key personnel in roles such as the department head role led to a shared vision for student learning and the teacher's responsibility, which led to science teacher retention.

Assertion seven suggests that former science teachers that become administrators may understand the difficulties science teachers face in a different manner than those without this experience. As evidenced by the Lorraine County science department, this insight may increase attrition as well. Brandon, a former science teacher and administrator who hires teachers in Lorraine County, intended to replace two of the science teachers due to chronic unsatisfactory observations. Due to his understanding of how science teachers should teach, he has altered the expectation of science teachers at LCHS. This highlights another tension reflected throughout this study: teacher retention of under qualified teachers does not equal success.

Assertions two and nine addressed dimensions of the teaching profession that influenced novice teachers' satisfaction. When the seniority system in place in schools was the means through which new teachers were assigned the most challenging teaching assignments, the

novice teachers became overwhelmed with their job. The two novice teachers in this study conveyed that the problems they experienced with teaching were specific to the individual school context in which they were teaching, not the profession. More experienced teachers, such as those at WCHS, believed that issues impacting satisfaction were due to the interpretation and application of rules within their individual school as well. They believed that schools where teachers were treated as highly capable, professionals were the exception, rather than the norm. Jessica explained, “You have to understand that the administrators’ hands are tied, too. It’s much too easy to just blame it on the administrator. Our profession needs an overall.” Thus, the two experienced teachers that tried to leave the school searched for employment outside of education while the two novice teachers tried to migrate to more urban or suburban contexts.

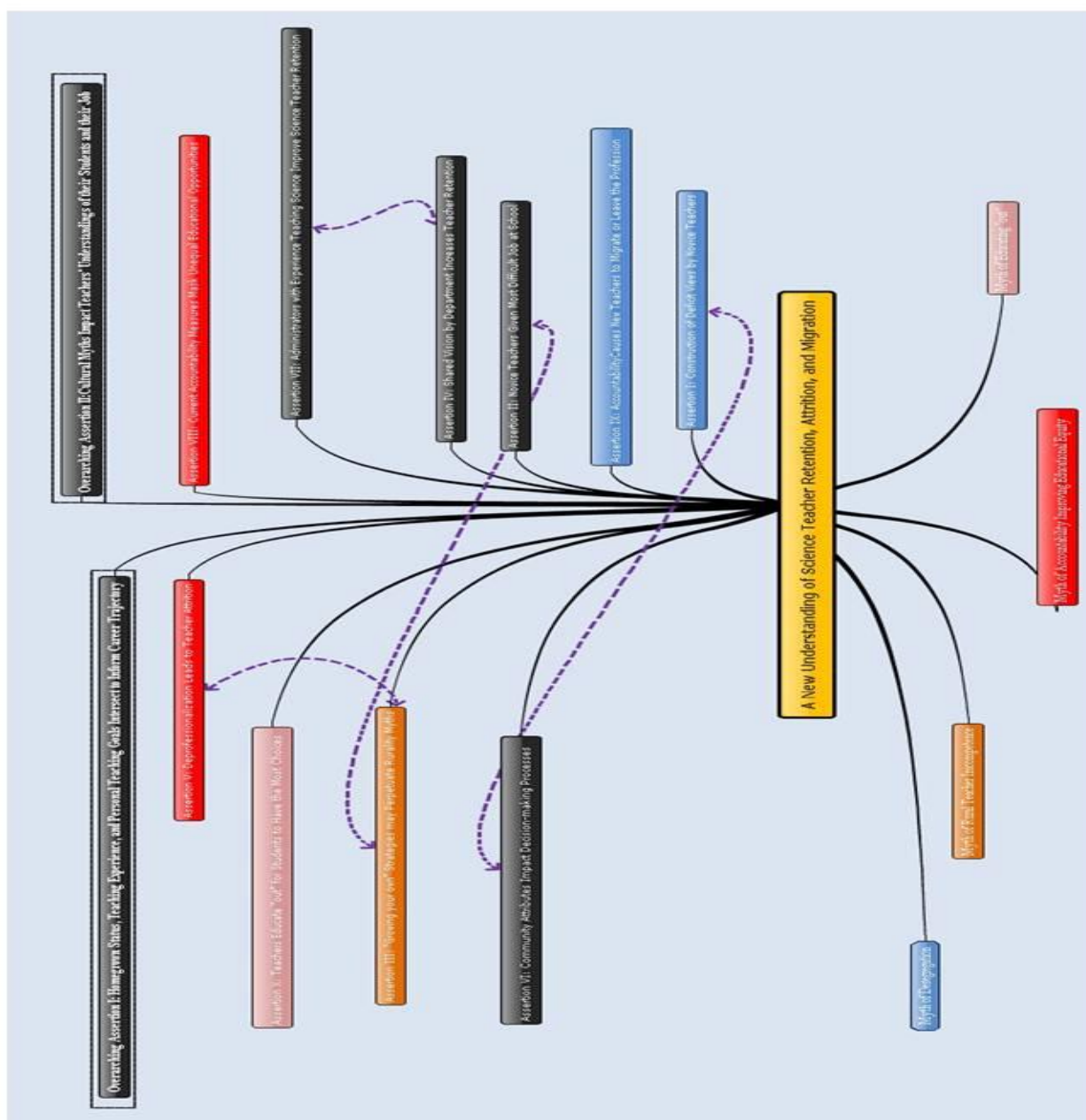
Assertion ten focused on the ramifications to individual teacher satisfaction that resulted from teachers aspiring to provide an education for each individual student that resulted in the greatest range of career and educational options upon graduation. Nine of the eleven educators who participated affirmed that their reasons for entering the teaching profession were altruistic: many them described what is often labeled as a social justice agenda undergirding their teaching philosophy. Most of the teachers felt a deep conflict created by the tension between the vision of the education that they sought to provide to the students and the reality of the education that they could provide. The vision was enhanced by the career and educational opportunities it seemed to provide for the students. The reality was clouded by the tremendous pressure created by the need for all students to perform well on standardized tests. All of the teachers, except Brady and Jason, conveyed this deep inner conflict due to the compromises they took for the sake of the reality but to the detriment of the vision.

### Four Cultural Myths

Throughout the study, teachers discussed the tensions they experienced while attempting to successfully educate their students. Four myths were salient with regard to these tensions across the secondary science teachers of all four school districts:

- The myth of desegregation;
- The myth of rural teacher incompetence;
- The myth of accountability improving educational equity; and
- The myth that teachers in rural areas only perceive *students leaving* as a successful outcome to their teaching.

Tobin and McRobbie (1996) suggested that teachers utilize cultural myths to justify choices made, due to specific contextual issues. Within this study, the researcher asserts that the aforementioned myths were ubiquitous, as evidenced by policy implementation, as well as indicators such as demographic characteristics. Thus, belief in each myth was present and acted to constrain science teachers, which led to dissatisfaction with the teaching profession, as evidenced in Figure 7.1. Figure 7.1 correlates the cultural myths with the associated assertions, graphically demonstrating the inextricable linking of the cultural myths and the assertions generated in this study of science teacher retention.



## **Implications**

Aiming to understand how and why individual teachers make career decisions is a difficult task, due to the complexity of individuals enacting their lives within a particular context. When untangling the decision-making process of each of the teachers, it is easy to make assumptions or stop questioning when one answer is given. Thus, the researcher interviewed the science teachers from the same schools multiple times in order to triangulate assertions that teachers made about the personal, professional, or contextual dimensions affecting their job. The implications reported here also reflect the researcher's subjectivity. This subjectivity might be concisely stated in this way: teacher retention without a complementary move toward educational excellence fails to further the education of all students. Thus, the implications portion of this document addresses science teacher retention from the perspective that all schools should aspire to recruit and retain only those teachers who meet or surpass the requirements set by the state and individual school districts. In order to reach this goal, individual states and schools districts must rethink how teachers are currently observed and evaluated or reductionism to state-level assessment will continue. Excluding Lorraine County, the teachers in this study believed that their administrators utilized their students' scores on standardized tests to evaluate their effectiveness. At Lorraine, Brandon utilized a framework that aligned with the national documents (AAAS, 1993; NSES, 1996) to assess science teacher effectiveness. He visited each of the science teachers' classes often, offering advice on implementing innovative teaching strategies. In order to provide an equitable education to all students, parents, community members, and policymakers must understand the complexity of the endeavor, realizing that there is not a one size fits all miracle cure for education. Thus, from the bottom-up, schools must

individually decide what their students need, and they should have the resources to provide it.

This section begins with implications for the teaching profession.

### **Implications for Novice Teacher Induction**

Two of the eleven participants were novices to the teaching profession. Dexter and Brittany were considered highly qualified in their field by the state of Georgia, and each planned to migrate to different schools as soon as possible. Scafidi et. al (2007) found that new teachers were more likely to change schools if they began their teaching career in districts characterized by a high proportion of low income students who scored lower on standardized, and were identified as members of minority ethnic or racial groups. Scafidi et. al (2007) suggested that policymakers must unravel what is going on within these schools in order to solve the problem. Both Dexter and Brittany indicated that the school in which they worked was not their first choice for employment, and they never intended to stay at their individual schools. Dexter and Brittany were both engaged to be married to people who lived in Atlanta. This personal tension pulled them away from the rural towns where they taught. However, Brittany and Dexter both identified dissatisfaction with the school context where they taught that had sufficient power to motivate them to depart.

Brittany and Dexter both taught course loads that are unparalleled in suburban and urban schools. Dexter taught all of the science courses for each middle school student at Five Points Charter School, as well as reading courses. Brittany taught six different courses across the school year on a four-by-four block. None of these courses had an associated End of Course Test (EOCT). Brittany explained that since there was no EOCT, her department head required that she pass all of her students and teach the courses at a “low level.” Her department head, Mr. Smith, indicated that Brittany’s course load was the most difficult, due to a lack of student commitment

to these courses. Although students were not explicitly told that Brittany could not give them homework or punish students for choosing not to participate in classroom discussions or activities, the students *knew*. Mr. Smith told Brittany that teaching the most difficult classes was simply a rite of passage. Since Dexter was the only middle school science teacher, his only choice was to teach all of the science classes. Unlike other members of his collegiate cohort who taught one or two preparations, in more suburban and urban areas, Dexter prepped seven courses. He explained that he looked forward to teaching the same classes more than once, so that he could improve his teaching skills. Dexter said, “If I just had time to maybe watch another teacher and see how she taught some of these concepts, I think I would get better at it. I feel like I’m just winging it.”

The profession as well as individual schools districts should alter their treatment of new teachers. Although mentoring and induction programs may improve teacher satisfaction (Koballa, 2009), the job description for new teachers should look different than that of an experienced teacher. Currently, the two job descriptions are synonymous on paper and thus an unwritten seniority system creates the difference in the job description. Consistently assigning new teachers difficult teaching schedules squelches their creativity and motivation. The assignment of these difficult schedules to the uninitiated teachers simultaneously conveys the message that teaching does not require skills development. New teachers are expected, or even required, to arrive with their full instructional skill set in place and ready for demanding use. Conversely, the researcher believes that teaching requires a vast set of skills that individuals must develop and hone over time. One’s ability as a teacher improves through thoughtful reflection and evaluation of teaching experiences. As long as the teaching profession fails to differentiate the job of novice and experienced teachers, many novice teachers will fail to find

satisfaction in the profession. But this failure to find satisfaction is not just about how seniority in teaching is linked to a new teacher being assigned the most challenging teaching schedule. It also applies to the expectation of that teacher to teach in such a way that his/her students make high scores on standardized tests. The skill set that new teachers must acquire also contains skills related to helping students achieve within the testing reality of schooling today. Thus the policies of schooling have a combinatorial effect that will continue to deprofessionalize teachers.

### **Professionalizing Science Teaching**

The following discussion asserts that in order to retain quality science teachers, progress toward the transformation of teaching into a profession must move forward. The following list of requirements for identifying science teaching as a profession was adapted from Sheila Tobias' (2009, p. 39-43) list of indicators. However, additions and deletions were made to the list, based on suggestions from the science teachers that participated in this study. Only suggestions that were salient to *this* place were included while those that did not pertain to the findings from this study were deleted. Professional secondary science teachers must have:

- In depth science specific content expertise
- Specific pedagogical content knowledge
- Code of ethical behavior
- A moral commitment to public service
- Compensation commensurate with experience and performance
- Professional autonomy in terms of self-governance and power for decision making about appropriate educative choices for classrooms.
- Mobility of benefits between schools, districts, and states

- Higher status in the minds of citizens
- Accountability commensurate with the job
- Career advancement / Job security
- Time allotted for collaboration and professional learning
- Input into policy at the federal, state, and local level
- Support staff for administrative duties
- Professional leave time to attend conferences

One hundred percent of the teachers that participated in the study cited feelings of deprofessionalization that influenced their satisfaction. Each of these teachers related to one or more of the aforementioned attributes of a profession. Current implementation of accountability measures emerged as the leading cause of deprofessionalization. One hundred percent of the science teachers in this study were highly qualified, in both their content and pedagogy, as evidenced by their education attainment. Seventy-two percent of the teachers completed an undergraduate degree in a science subject, and then added on certification through a higher education degree or the TAPP program in Georgia. However, these teachers conveyed the belief that their teaching was influenced more by the test scores that their students made on an examination that they did not construct than by their own understanding of an individual student's ability or educational need. Nine of the eleven teachers indicated that they desired a different type of accountability, one that related to how they performed their job. Mary explained, "There is no push for excellence in teaching, instead we celebrate mediocrity." As long as standardized tests serve as the sole instrument that determines the success of a student, school, or county, teachers will feel compelled to teach students how to master that test, celebrating mediocrity. One hundred percent of the teachers indicated that standardized tests

highlight trend data that may bring to light issues within a school or subject. For example, at Lorraine County High School, females continually scored lower, over six different courses, when Jason taught them. Thus, Brandon developed professional learning objectives for Jason that focused on teaching girls science. More often, this leads teachers, who have a moral commitment to improve the *individual* opportunities afforded to each student to teach to a test. This led all of the teachers in the study to utilize inordinate amounts of class-time test-prepping students. Ironically, this inordinate use of time was believed to serve little or no value in lifelong learning or scientific literacy for students. Instead, accountability, they foreshadowed, increased educational inequalities.

### **Providing Equitable Educational Opportunities**

Since the passage of the Elementary and Secondary Education Act of 1965 (ESEA), the federal government has provided resources to improve the education of poor students as well as minority students. The most recent reauthorization of the ESEA is known as No Child Left Behind (NCLB). NCLB has shifted the federal governments' interest in schooling toward a greater accountability for what students "learn". Within the rural context specifically, utilization of test scores as the primary indicator of success has caused teachers to compromise in unprecedented ways. Carrie, a science teacher of thirty-three years explained, "Throughout my years, I have never before compromised the way I have in the last three years. I want all of my kids to pass that graduation test, so I prepare them daily." All of the teachers indicated that they prepared students for testing throughout the year. All four of the schools studied implemented a test remediation course that juniors were required to take if they failed a predictor test. This required students to spend twenty-five percent of their day preparing for the multiple-choice test, in addition to the reviews provided for all of the students. Jessica explained, "we end up taking

the kids that have less reading skills out of interesting, engaging classes and place them in rote memorization classes.” This contradicts fundamental notions of the National Science Education Standards of what constitutes quality science teaching and learning (NRC, 1996). Although standardized test scores improved, teachers believed that many students actually learned less. Instead, this leads to increased discrepancies between the education of those that test well and those that do not, while policymakers assert that they have witnessed a closing of the achievement gap between African Americans and White students.

A lack of course offerings within this context led to a second area of inequality. Due to decreased enrollments and a limited number of students, these rural schools lacked the resources needed to support advanced placement courses, as well as other electives. Two of the schools studied lacked any fine arts programs as well. Since fine arts and advanced courses do not serve as indicators (or at least not indicators measured by test scores) that discern the health of schools, these schools continue to provide fewer opportunities for students based on where they live.

### **Theoretical Implications**

**Impact of neoliberalism.** The government created the requirement that public schools must put in place the aforementioned accountability measures due to an omnipresent neoliberal agenda that has saturated public and political discourse. Stromquist (2002) defined neoliberalism as an economic doctrine that utilizes the market as the most effective way of determining production and satisfying consumer needs. Since publication of *A Nation at Risk: The Imperative for Educational Reform* (1983), which asserted that public schools were in a crisis that put the nation at risk economically and politically, neoliberalism has guided the educational system in the United States. The report utilized typical market discourse (e.g., accountability, choice, failure) to describe the ills of public education (Klaf & Kwan, 2010) as well the way to

solve educational issues. Multiple business interest groups, such as the Business Roundtable explained that the business community is “committed to advocating public policies that improve education performance and workforce competitiveness in the United States” and suggested that schools should prepare “U.S. students and the U.S. workforce to succeed in our changing world”(Business Roundtable, 2007). These values were reflected in the most recent federal educational reform policy: *The No Child Left Behind Act of 2001*. NCLB established the Title I program to support and improve the academic achievement of poor/disadvantaged students. NCLB aimed to close the achievement gap between disadvantaged/ minority children and their peers (U.S. Department of Education, 2007).

The four tenants of NCLB included: (1) stronger accountability for results, (2) expanded flexibility and local control, (3) increased options for parents, and (4) an emphasis on utilizing scientific research to inform practice (U.S. Department of Education, 2007). As long as policymakers view the educational system through the neoliberal ideology that envisions a school as a market, an area in which controlled goods (children) enter and a treatment (education) is given, cultural constraints that influence schooling and subsequent teacher retention will go unnoticed. Sorting students, teachers, schools, and communities through a one-size-fits-all paradigm fails to attain the original goal of the provision of an equitable education.

**Geography of educational outcomes.** Many studies of teacher retention have focused on correlations between student demographics and career trajectory (Horng, 2009; Ingersoll, 2009). There is a growing body of literature (Roscigno, Tomaskovic, & Crowley, 2006; Zhang & Cowen, 2009) focused on the educational inequalities of students, based on geography. Zhang’s (2009) longitudinal study highlighted four components of geographical analysis that lack inquiry. First, through Zhang’s (2007) study of the public schools in South Carolina, he asserted that

research that focused on simply “checking the differences between urban, suburban, and rural schools may mask the complexity of the spatial inequalities in academic achievement” (Zhang, 2009). He highlighted examples of inner city, urban schools that thrived while many suburban schools declined in academic achievement, due to the school choice options and middle class flight from suburbs. Second, Zhang (2009) suggested that the study of the impact of socioeconomic status (SES) surrounding schools impacted academic achievement, due to the amount of property taxes collected. Geographical information systems studies (Pearce, 2000; Zhang, 2006) have linked increased SES with improved performance on standardized tests. Third, Zhang (2009) used geographical analysis that quantitatively enumerated that students who attended rural schools in South Carolina experienced the least amount of choice when their school failed. Zhang (2009) found that the smallest, most remote schools in South Carolina were the most likely schools to fail, and the least likely to have a second “choice” for students. This supported the rural disadvantage highlighted by Beason and Strange (2003). In South Carolina, Zhang (2009) found that rural teachers were as qualified to teach their classes as their urban and suburban peers, but they were much more likely to migrate to a different school. Zhang (2009) found that collectively, poverty, teacher turnover rates, and neighborhood SES predicted student achievement of South Carolina students on the state-wide standardized test administered.

Within the context of this study, Zhang’s (2009) findings were salient to the four counties studied. In 2008, Gray County, home to prestigious Valley Lake (a multiuse housing community that caters to those individuals and families in the upper middle class and beyond), opened Valley Lake Academy in 2008. In 2009, Valley Lake Academy served 65 students, one hundred percent of whom were white, none of whom were eligible for a free or reduced lunch. Meanwhile, Gray Elementary School served 577 students, 87% of whom were African

American, 70% of whom were eligible for a free or reduced lunch. Thus, in one rural county, two schools served very different student populations.

### **Methodological Implications**

Due to the in-depth, interpretive design of this study, a more nuanced rendering of the tensions affecting career trajectory emerged. Over the course of the study, teachers indicated varying levels of satisfaction as well as future plans determining career trajectory. Multiple large, quantitative studies have suggested reasons for science teacher attrition, basing their findings on one “snapshot” of an individual teacher. Typically, this data was collected remotely, *after* teachers left their school via survey (Ingersoll, 2001). From this data, generalizations about teachers have constructed a portrait of who stays, leaves, and migrates from the profession. This study focused on the experiences of eleven educators and triangulated findings about individual schools, using focus groups, and participant observation. Each participant engaged in individual interviews, providing an opportunity to discuss issues pertaining to their job privately. After the researcher analyzed this data, the science teachers from each school participated in focus groups, where they engaged in conversations together about their school. Typically, larger quantitative studies have failed to triangulate findings that related to administrators and other context related dimensions.

Although this methodology offered a rich picture of science teacher retention within this four county region, data collection and analysis remained challenging, beginning with the sample used. For example, although the counties studied are contiguous, the populations are not identical. Moreover, with humans, there is no such thing as an identical population. Second, individuals’ perspectives are always influenced by changing events in their daily lives. As this study was not carried out as an educational ethnography, the researcher may have only glimpsed

a snapshot in time, distributed across a large geographical area, leaving the data vulnerable to missing parts of participants' stories. The following section describes the implications for future research, which seek to remedy the aforementioned tensions.

### **Implications for Future Research**

Due to the limited time and resources devoted to this study questions beyond the research focus were left unanswered while many new questions were constructed. For example, since this study focused specifically on teachers, student data included only test scores and demographic data. Further study of student learning utilizing performance based assessments would provide rich data on what type of learning is happening at each of the schools.

Another important topic left unexplored involved the perception of teacher retention from the perspective of administrators and teachers outside of the science department. Their input would provide more depth to the study. Similarly, focus groups and life history interviews of community members could enrich the understandings of the relationship between the teachers, the school, and community members. Questions posed would ideally focus on the perceptions of the parents regarding the education their child received within the school.

Finally, the researcher would like to continue this research for many years, creating a longitudinal, in-depth data set. Most longitudinal data simply provides snapshots of the same place over many years. An in-depth longitudinal design of purposively chosen participants could provide telling insight into how the profession might support teachers over time. How do teachers' needs / desires change and how could the profession/school support them? The researcher would also like to utilize a similar research protocol across suburban and urban school districts to explore tensions impacting career trajectory in different places.

Collectively, these additions to future research would provide an opportunity to talk to teachers about some of the things that they did not mention. For example, how might teachers define deprofessionalization. Is this the correct word, do they truly desire a job with the tenants of a profession? Second, how do teachers conceptualize career trajectory? Do they plan to stay for twenty years or do they envision teaching for just a few years? Finally, do teachers believe that all students should experience the *same* education; alternatively, do they feel that the educational experience should differ from school to school, reflecting diverse educational contexts?

### **Conclusion**

Although I do not suggest that this inquiry into rural science teaching is complete, this study has produced implications that may improve our educational system. The study found that some schools were succeeding at retaining highly qualified teachers, while others lost teachers, for varying reasons. Upon studying individual schools within particular places, I was struck by the interconnectivity of schools, teachers, and their communities in these rural counties. How could a school possibly provide multiple course offerings for 70 high school students when there is only one science teacher? Moreover, how could anyone expect a teacher not to resort to teaching to a test when that teacher *knows* that an individual student must have a diploma to find work? The lofty endeavor of providing all children in the United States with a quality education is fraught with hurdles, some of which our society perpetuates, but others we fail to see due to our own cultural myths. However, I believe that a notion of freedom, choice, and equity for all people is a worthy goal supported by educating all people. This snap-shot of four county schools, from the science teachers' perspective, offers hope for improving the educational experience of students that attend the small, rural schools while openly critiquing the neo-liberal

ideals as well as the geographic inequalities that stand to perpetuate unequal educational opportunities.

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