ABSTRACT


Retention of science teachers is an issue of national concern; as more than half of all new science teachers will leave the profession within the first five years. An influx of teacher turnover results in higher district spending, lower test scores, and a less effective environment for student learning. Despite the myriad reasons why science teachers are leaving the profession, some choose to stay. This study investigates why teachers remain in the profession beyond that critical five-year window.

Through semi-structured, in-depth interviews, twenty mid- and late-career secondary science teachers in North Carolina discussed their beliefs on teacher identity and how their own identity influences their retention decisions. The interviews were designed to answer the following research questions: 1) What are the teacher identity characteristics of mid- and late-career teachers which may influence their decision to remain in the profession? 2) How do professional development programs impact the identities of North Carolina science teachers and their decisions to remain in the classroom?

Using the constant comparative method, interview data was analyzed and categorized by theme. The findings indicated teachers who develop strong relationships with students, colleagues, and administration have a more positive teacher identity and are more likely to see benefits in remaining in the classroom. Additionally, professional development which seeks to create valuable communities of practice can assist in the development of teacher identity.

by
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DEDICATION

To my incredible fiancé, London White, for the many years of support and encouragement.

I love you and I like you.

To my mama, Dianne Cheers, for keeping me grounded but allowing me to fly.

In memory of my Ganky. I know you are with me every day. I could not love or miss you more.
BIOGRAPHY

Whitney Dianne Richardson was born in Wilmington, North Carolina, in July 1986. After graduating high school, Whitney attended Brunswick Community College and later studied Middle Grades Education at The University of North Carolina at Wilmington. After graduating Summa Cum Laude in 2009, Whitney began teaching middle grades science and mathematics at Shallotte Middle School. The school held a special place in her heart, as she had the opportunity to work with her role model and older brother, Dr. Daniel Richardson. While at Shallotte Middle School, Whitney served as a coach for North Carolina Science Olympiad, a program with which she has been involved for twenty-one years—first as a student, then as an event leader and coach, and later as the New Coach Coordinator for the state of North Carolina. She also coached girls’ soccer and cheerleading, and she served on the school leadership committee in addition to 6th grade department chair.

Despite her busy schedule, Whitney attended East Carolina University part-time and earned her M.Ed. in Science Education in 2013. In 2015, Whitney made the decision to pursue a PhD in Science Education at North Carolina State University. While attending the university full time, Whitney served in several roles as a graduate assistant and also worked as a curriculum developer for the United States Environmental Protection Agency, where she created K-12 materials on various topics surrounding air quality. Whitney found her niche when given the opportunity to work as a Program Coordinator for the College of Education at NC State, and through doing so has set forth on a path to do what she loves most. After graduation, Whitney will marry her fiancé, London White, and will continue working as an advocate of education for all.
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CHAPTER I: INTRODUCTION

Public education is suffering due to the lack of qualified and passionate teachers who choose to stay in the classroom (Alexander & Miller, 2017). Teacher shortages most heavily impact science and mathematics content and special education, with these being the areas of public education with the highest levels of teacher turnover (Goldhaber, Krieg, Theobald, & Brown, 2014). Of particular concern for public education is the dwindling numbers of qualified science teachers who are entering and remaining in the teaching profession. With a myriad of professional options available to those inclined toward science, education seems to be a lackluster career choice (Grissom, Viano, & Selin, 2016). Attrition is expected to occur in all career fields, with education being no exception. However, increasing teacher turnover is not only impacting the profession, but is also potentially damaging to K-12 students who rely on high-quality science teachers every day (Ronfeldt, Loeb, & Wyckoff, 2013).

The lack of qualified science teachers in the United States is an educational research priority, with many researchers having looked into recruitment and preparation of beginning teachers as a countermeasure for this issue (Borgerding, 2015; Guarino, Santibanez, & Daley, 2006; Hirsch, 2001; Hubbard, Embry-Jenlink, & Beverly, 2015). Recruitment, however, does not equate to the retention of qualified, committed teachers. The majority of teacher turnover in North Carolina occurs prior to a teacher receiving their career status license, which takes five probationary years (NCDPI, 2015). Hiring and training new teachers is essential to replenish the retiring veteran staff and to bring innovative ideas into schools. Unfortunately, many schools struggle fill all classroom vacancies, despite more qualified teachers graduating each year than are needed (Darling-Hammond, 2003).
Teachers exit the profession for countless reasons (Buchanan et al., 2010; Smithers & Robinson, 2003; Walters, 2004), and science teachers are particularly at risk for leaving the classroom in order to work in fields outside of education (Kelly, 2004). Many secondary science teachers in North Carolina have backgrounds in specific fields of science in addition to their pre-service education training. Careers outside of education are often perceived as providing recognition of skills and monetary compensation not offered to teachers (Grissom et al., 2016). Of course, not all science teachers who leave the profession do so to explore science fields. Other external factors are likely to increase a science teacher’s decision to leave the classroom. Commonly cited reasons for teacher attrition include workload, school environment, community/parental support, low pay, and demanding work hours (Skaalvik & Skaalvik, 2015). These factors are not controlled by the individual, but rather are circumstantial (in the instance of difficult parents), administrative (regarding school environment), or policy based (including long workdays and low pay). These reasons for attrition, while not necessarily indicative of teachers’ opinions of the profession as a whole, are incredibly important and cannot be overlooked when considering science teacher loss.

External factors must be regarded as valuable when discussing teacher retention, but a body of research (Canirus, Helms-Lorenz, Beijaard; Buitnik, Hohman, 2012; Flores & Day, 2005; Skaalvik & Skaalvik, 2015; Zembylas, 2003) has discussed the importance of looking to internal factors which influence decision making. A major hurdle in educational research is to identify and understand these internal factors, particularly regarding why some teachers remain in the profession and others do not.

Internal factors, for the purpose of this study, are identified as those motivating thoughts and beliefs held by an individual in regards to their role in the teaching profession,
ability to convey knowledge, and sense of belonging in the classroom. When internalized, many of the experiences faced by teachers become a part of who they are (Helms, 1998). When this happens, the experience has helped to develop part of that teacher’s identity, one of the most important factors in teacher development (Canrinus, Helms-Lorenz, Beijaard, Buitink, & Hofman, 2012; Olsen, 2008).

James Paul Gee, who is often credited for providing the framework through which relevant identity research has been based, describes identity as an individual’s ability to recognize themselves as a certain “kind of person” within varying contexts (Gee, 2000). Gee discusses ways in which identity can be an effective analytical tool through which to view theoretical and practical issues in education (p. 100). Situated in the context of teaching, identity is constantly changing in conjunction with social interactions and evolving expectations.

Teacher identity is invaluable in the overall development of pedagogical practice, job satisfaction, motivation, and commitment to the profession (Canrinus et al., 2011). Currently, the literature surrounding teacher identity and career commitment fall into three major themes: recruitment of pre-service teachers (Chong & Low, 2009; Day, Elliot, & Kington, 2005; Olsen & Buchanan, 2017); identity development of beginning teachers (Izadinia, 2015; Miller & Shifflet, 2016; Sutherland, Howard, & Markauskaite, 2010; Wink, Ellefson, Nishimura, Perry, Wenzel & Choe, 2008); and reasons for teacher attrition (Clendinin, Long, Schaeffer, Downy, Steeves, Pennegar, Robblee, & Wnuk, 2015; Hong, 2010). The body of literature focusing on identity factors which influence science teacher retention is limited, particularly when discussing mid and late career educators.
Purpose of the Study

The purpose of this study is to identify connections between teacher identity and retention in North Carolina science teachers. Specifically, this study sought to investigate characteristics of teacher identity which might influence retention, and the role professional development plays in supporting the growth of teacher identity for mid- and late-career science teachers. Understanding teacher identity is essential in determining characteristics common of those educators who stay in their field (Hong, 2012). As veteran teachers begin to retire, the state of North Carolina will be in dire need of passionate teachers who will remain in the classroom and become active members of the school community.

The purpose of this study can be viewed through two lenses: theoretical implications and practitioner-based propositions. From a theoretical standpoint, this study is designed to support current research surrounding teacher identity. Teacher identity research has evolved since Gee’s (2000) discussion of identity as a method for educational research. Nearly two decades later, the body of research regarding pre- and in-service teacher identity has grown tremendously. For this reason, the understanding of identity development has been applied in various contexts within educational research. In the context of teacher identity for mid- and late-career teachers, however, greater insight is necessary to understand their unique needs. Since teacher identity is not static, the study of how identity changes and develops over time is important in understanding identity characteristics which support teacher retention.

Limited research is available for discussion of how these identity characteristics influence a teacher’s decision to remain in the classroom. This study provides evidence toward the need for further identity research as well as possible connections between identity characteristics and retention decisions.
In regard to practitioner-based research, this study discusses many of the ways professional development programs can promote identity characteristics in mid- and late-career teachers. In North Carolina, specific programs are offered to foster the pedagogical development of new teachers, but few programs are designed to support the developmental needs of those teachers with greater than five years of experience. State-mandated continuing education requirements mean teachers of all experience levels will undergo professional development opportunities throughout each school year (NCDPI). Despite these programs, teachers are still leaving the profession at an alarming rate. Current opportunities for professional growth may assist in the development of capable teachers of science content (Supovitz & Turner, 2000) but are not necessarily helping teachers to develop the professional identities needed to maintain their position (Lasky, 2005). Therefore, the concept of teacher identity growth through professional development opportunities is investigated in this study.

**Research Questions**

To best inform the literature on science teacher identity and retention, the following research questions were investigated in this study:

1. What are the teacher identity characteristics of mid and late career teachers which may influence their decision to remain in the profession?

2. How do professional development programs impact the identities of North Carolina science teachers and their decisions to remain in the classroom?

Using qualitative methods, a rich description of teacher professional identity in mid- and late-career science educators in secondary settings has been developed. While identity research is relevant in the context of all content areas and grade levels, science educators
were specifically chosen for this study due to the incredibly high turnover of middle and high school science teachers in North Carolina (NCDPI).

Participating schools within this study fall into two categories: schools with high science teacher turnover and schools with low science teacher turnover in relation to the state average. In order to qualify for the study, teachers must teach science content in grades 6-12 for at least fifty percent of their work day and must have attained career status. Career status indicates all teachers have completed their initial licensing program and are no longer in a probationary role. For this reason, all participants in this study have been in the profession for a minimum of six years. For the purpose of this study, mid-career teachers are classified as those with six to fourteen years of experience, and late-career teachers have fifteen or more years in the classroom.

**Issues Associated with Teacher Turnover in North Carolina**

Among the many obstacles facing public education today, teacher retention is one of the most discussed and widely-disputed topics (Barth, Dillon, Hull & Higgins, 2016; Burke et al., 2013; Ingersoll & May, 2011; Liu & Ramsey, 2008). From university programs designed for pre-service teacher education (Luft et al., 2005), to district, state and national policy makers (Aragon, 2016; Hong 2008), the future of education relies heavily on the beliefs of educational stakeholders.

Critical to the performance of a school is the dedication of teachers. While many staff and personnel work together to make a school run efficiently, the teachers in the building are the ones who create a supportive learning atmosphere for students (Wolff, van den Bogert, Jarodzka, & Boshuizen, 2015). Teacher turnover is damaging to student learning experiences in all content areas (Ronfeldt et al., 2013). This is especially true for middle and high school
science education in North Carolina. Inconsistent staffing from year to year means that instruction will fail to be consistent for groups of students. While some instructional inconsistencies are expected due to pedagogical preferences by individual teachers, an overall inconsistency can cause issues for the school’s science community as a whole (Ingersoll & May, 2010).

In North Carolina, schools and individual teachers are assigned grades based on their performance evaluations (NCDPI). The school report card indicates, among other data points, the percentages of students who pass end of grade/end of course assessments for specific content areas. It is perceived that, while career status teachers still require professional development, they will have greater student achievement than beginning teachers as they have the experience necessary to develop their Pedagogical Content Knowledge (PCK) (Lee & Luft, 2008; Park & Oliver, 2008). PCK, while present in beginning teachers, is more developed in career status/veteran teachers as they have valuable experiences which shape a teacher’s practice (Lee et al., 2007). Without teachers who are confident in their pedagogical and content knowledge, student performance suffers (Sadler et al., 2013). Student performance on assessments and student learning are not always measurable by the same tool. However, this bar, set by policymakers, must be acknowledged as a factor in school performance and assumed teacher ability.

Teacher attrition is particularly high for North Carolina teachers in the first five years, regardless of their content or grade band (NCDPI, 2016). For STEM and Special Education teachers, these numbers are particularly high in latter years of the profession as well (Goldhaber, Krieg, Theobald, & Brown, 2014). The drastic number of early departures from the profession causes an aperture where there is already dwindling enthusiasm from mid-
career teachers (Lavigne & Bozack, 2015). This is problematic, particularly as more and more veteran teachers approach retirement age. During the 2015-2016 school year, 19.8% of North Carolina teachers who left the classroom did so through retirement (NCDPI). In same school year, nearly 7,000 additional teachers left North Carolina public schools. With over 1,700 North Carolina teachers retiring at the summation of the average school year, new teachers must come in to fill these gaps. As additional teacher turnover continues to increase, experienced teachers will begin to phase out of the school system all together. With fewer veteran teachers, schools will slowly begin losing the value an experienced staff brings (Lavigne & Bozack, 2015). This is especially true in STEM content, with both middle school and high school science being among the top five hardest content areas to staff in North Carolina Public Schools (NCDPI).

**External Factors Impacting Teacher Shortage**

A 2003 study conducted by Murphy et al. predicted by the year 2013, North Carolina would be facing a significant teacher shortage in comparison to other states across the country. This prediction was in alignment with the current state of North Carolina Public Schools. North Carolina’s teacher shortage is of particular interest due to recent media coverage regarding teacher pay and retirement. Nationally, North Carolina ranks 9th in total population and 10th in students’ enrollment in public schools according to a 2016 report by the National Education Association. The same report noted that North Carolina teachers are among some of the lowest paid in the country, moving from 44th to 40th in average salary after a 0.3% raise in 2015. Teachers in North Carolina are eligible for additional compensation through stipends from their districts. The amount of money allocated for each district is proportionate to the local income tax collected. However, these amounts vary from
district to district; for those teachers in rural school areas, stipends may not be available for all teachers. These minor monetary compensations, however, are not a significant factor in keeping North Carolina teachers in the classroom. The number of teachers who left North Carolina to teach in a different state more than tripled over the course of five years, as many neighboring states have a significantly higher base pay (NCDPI, 2015).

Additionally, there is very little room for salary advancement for teachers choosing to remain in North Carolina Public Schools. Teachers who began a graduate (Masters or Doctoral) program after 2013 are not eligible to receive an increase in pay (NCDPI). This is damaging for the higher education institutions who depend on graduate education as a pivotal part of their education programs, as undergraduate, pre-service teacher enrollment is also steadily declining (Sawchuk, 2013). This is not only damaging to the universities which depend on incoming graduate students, but to the K-12 students who will ultimately have fewer teachers pursuing growth opportunities while remaining in the classroom. Science and math teachers with advanced degrees have been shown to have greater impact on student achievement (Goldhaber & Brewer, 1996), yet they are also at a greater risk of pursuing alternative career opportunities. Teachers who are engaged in research or interested in increasing their qualifications through an advanced degree are more likely to leave the classroom and seek out other areas of employment (Struyven & Vanthournout, 2014).

**Internal Factors Impacting Teacher Shortage**

Teacher identity is an internal factor in determining a teacher’s decision to remain in the profession. Internal factors assist in the development of professional identity, which must be internalized and processed by the individual, and are often the result of past experiences,
one’s belief in their own abilities, or how the individual responds to external stimuli (Gee, 2000).

Self-efficacy (Bandura, 1982) is an important internal factor which impacts the science teacher shortage in North Carolina. Self-efficacy for science teachers relates to an individual’s perception of the teacher’s ability to do their job effectively (Posnanski, 2007). Albert Bandura originally defined self-efficacy as relating one’s beliefs in their abilities directly with their performance (1982). Therefore, a teacher with a positive self-efficacy should present characteristics more similar to other successful teachers than those who lack belief in their abilities. Self-efficacy should not be confused with identity, as identity relates to the views an individual has about who they are, whereas self-efficacy is how an individuals view their aptitudes. Researchers will sometimes discuss self-efficacy when studying identity, since self-efficacy can play a major role in how some teachers view their function within the school community (Settlage, Southerland, Smith, & Ceglie, 2009).

Another valuable internal factor to discuss when considering the science teacher shortage issue in North Carolina is Pedagogical Content Knowledge (PCK). PCK refers to the ability of a teacher to transform their knowledge of content to instruction which is relevant for teaching and is comprehensible by students (Park & Oliver, 2008). PCK for science teachers is incredibly important, particularly due to the complex relationship between sufficient teacher knowledge and proper instruction regarding the nature of science (Van Driel, Verloop, & De Vos, 1998). Some teachers of science have rich content backgrounds but lack the pedagogical knowledge necessary to teach effectively (Kind, 2009). The opposite is also often true; teachers who majored in education with a science concentration might have extensive knowledge of effective teaching strategies but lack some of the content
knowledge necessary for deep understanding (Van Driel et al., 1997). According to Park and Oliver (2008), PCK is fluid and continually changing as the teacher grows and develops; it also plays a pivotal role in a teacher’s view of their effectiveness as a professional.

Self-efficacy and PCK are essential in the development of qualified, proficient teachers (Park & Oliver, 2008). Both of these internal factors build upon and grow from the individual’s beliefs about who they are within the school environment, which can support the development of their science teacher identity.

**Teacher Identity and Teacher Retention**

Teacher identity describes how an individual would answer the question, “Who am I?” in terms of their role in their career (Gee, 2000) and is influenced through various external and internal factors as previously described. The perception of these factors is internalized and over time develops within the individual (Avraamidou, 2016; Beijaard et al., 2000; Hong, 2008; O’Conner, 2008). Teacher identity is highly malleable in the first few years of teaching (Hong), as beginning teachers are more likely to have unfamiliar experiences with which they must learn to adapt. This is one reason why literature on beginning teachers is so prevalent. Due to the malleable nature of identity, however, researchers must also consider those contexts which influence identity development for career status teachers. The lens through which a teacher views their purpose, role, and effectiveness develops over time through a series of interactions with administration, students, colleagues, parents, and the community as well as within their personal community of support (Eick & Reed, 2002). Teacher professional identity as a lens through which to review teacher attrition is widely-researched; however, this is not sufficient in understanding the role of teacher identity in the decision to remain in the profession.
Critical Incidents in Mid and Late Career Science Teachers

Throughout their careers, science teachers will face unique circumstances and interactions with others. If these interactions cause the teacher to question their stance on an issue or illicit a moral response, these circumstances are referred to as critical incidents. For some, negative critical incidents act as a catalyst for their decision to leave the profession (Skaalvik & Skaalvik, 2015). Examples of these negative experiences may include difficulty assimilating to the school environment, issues with parents/the community, or overall dissatisfaction with the teaching profession.

For those who do remain in the profession, however, these incidents aid in the development of their identity as a teacher (Friesen & Besley, 2013). Presumably, there are differences in the experiences and subsequent reactions by those teachers who have been in the classroom for many years versus those who are just beginning (Lavigne & Bozack, 2015). The variances in these experiences and how they influence identity is not widely known, although this study was developed around the assumption that all teachers who experience critical incidents will experience an identity shift during their tenure.

Professional Development and Teacher Identity

Many professional development programs, mandated or optional, incorporate strategies to increase personal reflection (Walkington, 2005) and integrate teachers into a community of practice (Lave & Wenger, 1991). North Carolina requires teachers to become “Reflective Practitioners” as a component of their summative performance evaluation (NCDPI). For many career educators in North Carolina, the National Board Certification (NBC) process, offered by the National Board for Professional Teaching Standards, is a route to develop their own understanding of their pedagogical beliefs. This three-year, intensive
program requires teachers to become reflective in their practice and to view their teaching style, content, and ability to deliver content (PCK) through a highly analytical lens. Additionally, in North Carolina, National Board Certified Teachers (NBCTs) receive a significant annual pay increase as long as they hold the certification, which must be renewed every ten years.

While no studies on the NBC program have directly related to teacher identity, Goldhaber and Hansen (2009) noted in a study of North Carolina teachers that those who successfully completed the NBC program were more likely to leave North Carolina public schools than other teachers (in this instance, those who did not receive NBC). According to their finding, this program, which is designed to enhance quality instruction, appears to be a resume builder for many of North Carolina’s teachers.

Additionally, systemic programs for in-service teachers often require teachers to participate in communities of practice (Lave & Wenger, 1991; Wenger, 1998), which are groups of people within the same professional field. In North Carolina, these groups often begin during the first years of teaching in the North Carolina Beginning Teacher Support Program (NCBTSP) or within grade level/content teams. Often teachers of the same grade level (K-8) and teachers of the same content (9-12) will participate in Professional Learning Communities (PLCs) where they are encouraged to discuss pedagogy, content pacing, and instructional strategies to improve student performance (Supovitz & Turner, 2000).

As the purpose of individual and group professional development is to cultivate highly thoughtful and introspective educators, it is imperative to determine what (if any) benefits these programs provide towards these goals.
Significance of the Study

Identity research does not have a narrow scope; there are many branches of identity in which one could concentrate, though the majority of relevant research focuses on understanding what identity is and how it should be applied to improve experiences for beginning and pre-service teachers (Beauchamp & Thomas, 2009). Other common themes in identity research include the fluidity of teacher identity (Cattley, 2007); the discourse and narrative of an individual (Alsup, 2006); the influence of sociocultural groups on individual identity (Zembylas, 2003); and the influence of identity on teacher on beginning teachers (Walkington, 2005).

Limited research has been published on the intrinsic motivational factors which influence identity, and even less on the role of identity in science teachers’ retention. Instead, the majority of research focuses on why teachers leave the profession (Boyd et al., 2005; Grissom et al., 2016; Hong, 2008; Ingersoll, 2011; Ingersoll et al., 2014; Joiner & Edwards, 2008; Lindquist et al., 2013; Skaalvik & Skaalvik, 2011). Research on teacher attrition does not assist in retaining science educators, as research cannot be relevant post factum. Stakeholders must examine what influences teachers’ decisions to stay the profession and demand a call for action to encourage retention of quality teachers.

It is important to note that the studies conducted on beginning teachers’ identity and attrition are imperative as new teachers have an increased likelihood of leaving the profession (Clandinin et al., 2015). Research has missed the mark, however, in investigating how these factors influence teachers at later points in their careers. The objective of this study is to bridge a gap in identity research within the subtext of teacher retention and focus on developing those characteristics which might help in retaining high-quality science
educators. This research is not intended to detract from important findings and applications of any prior research, but rather to supply a case for continuing research efforts with science teachers situated in multiple contexts.

The conclusions drawn by this study will result in a greater understanding of those common attributes possessed by individuals who are inclined to remain in the teaching profession, ultimately resulting in a greater understanding of how to nurture the development of these qualities in all science teachers.

**Summary**

Science teachers leave the profession for a variety of reasons (Buchanan et al., 2010; Grissom et al. 2016; Skaalvik & Skaalvik, 2015; Smithers & Robinson, 2003; Walters, 2004). High teacher turnover is problematic for school districts and impacts student performance. This study identifies teacher identity characteristics which may influence teacher retention as well as those processes through which these identity characteristics can be fostered.

For some, the decision to stay in the classroom is motivated by external factors (Skaalvik & Skaalvik, 2015), but for many, identity within the classroom becomes a more valuable consideration in determining their professional future (Olsen, 2016). What do those science teachers who continue to teach, despite outside influences, do differently than others? What makes a science teacher decide to stay? This study examines these factors and discusses the impact of understanding science teacher identity for the future of science education in North Carolina.

In this chapter, I have introduced teacher identity and why research is valuable in understanding science teacher retention. In the next chapter, I examine the historical context
of professional identity through a review of relevant literature. Additionally, I examine recent literature surrounding science teacher recruitment, retention, and attrition to best discuss the current state of science education.
CHAPTER II: REVIEW OF THE LITERATURE

Across the United States, school systems are facing high teacher turnover (Carver-Thomas & Darling-Hammond, 2017), while colleges and universities are battling low enrollment numbers in their pre-service education programs (Aragon, 2016). Teachers are not just leaving the classroom for retirement; at twice the rate of high performing nations, American teachers are leaving for alternative employment (Berry & Shields, 2017).

Annually, the greatest teacher turnover occurs in the South (16.7%), whereas schools in the Northeast tend to see significantly less teacher turnover (10.3%) (Stein & Stein, 2016). Teacher turnover also tends to be significantly higher for teachers of special needs students and those who teach science and/or mathematics in a middle or high school setting (Gary & Taie, 2015; Ingersoll & May, 2010).

In the United States, tens of thousands of beginning or mid-career teachers leave their teaching positions annually (Stein & Stein, 2016), despite some states issuing more teacher certifications in recent years than ever before (Adnot, Dee, Katz, & Wyckoff, 2016). Teacher attrition, or the decision to leave the classroom, is not a one-size-fits-all problem. What is consistent is that teachers in urban or high poverty areas, as well as teachers in low-paying districts, are more likely to depart within their first five years in the profession (Aragon, 2016).

Teacher Shortages in Public Schools

Teacher Turnover and Student Achievement

While some literature supports the theory that high teacher turnover negatively impacts student achievement this little-researched area is still up for debate (Guin, 2004). Some researchers discuss teacher turnover in terms of effectiveness. If less effective teachers
exit the classroom, student performance actually increases (Adnot, Dee & Katz, 2017; Jackson, 2010; Staiger & Rockoff, 2010). Additionally, research discusses the fact that some teachers who leave are more likely to be the less effective teachers in the first place (Goldhaber, Gross & Player, 2007). Researchers have noted that even if student performance suffered in high turnover schools, other contributing factors, such as poverty, could ultimately have a causal relationship on student performance greater than that of losing teachers (Ronfeldt, Loeb, & Wyckoff, 2013).

On the contrary, very little research has emphasized the importance of teacher retention for student achievement, discussing ways in which students would benefit with low turnover (Ronfeldt et al., 2013). This is particularly true for schools in which teacher turnover is highest—those schools which are composed primarily of high-poverty, low-income students, or those whose demographics are primarily non-White or non-English speaking (Ingersoll & May, 2010; Ronfeldt et al., 2013). Retention of effective teachers is necessary in these already struggling schools, as their performance will continue to suffer following the same trajectory (Adnot et al., 2016). Schools with organizational issues such as poor working conditions, inconsistent leadership, and ineffective student discipline policies saw a stark increase in turnover of science teachers in contrast to those schools where the organization was more progressive (Ingersoll & May).

Once more, teacher effectiveness may be a lens through which to view teacher attrition in North Carolina. Those teachers who chose to leave for non-retirement purposes showed significantly less effectiveness by measure of standardized test scores than did their counterparts who decided to remain in the classroom (Henry, Bastian, & Fortner, 2011;
NCDPI, 2016). This is especially true of beginning teachers, who leave the profession at the highest rates than any other subgroup in North Carolina (NCDPI, 2016).

Additionally, a little-considered effect of teacher turnover is the fiscal damage caused to districts—many of which already struggle with shrinking budgets (Watlington, Shockley, Guglielmino & Felsher, 2010). Included in their discussion of the various costs associated with teacher turnover, Watlington et al. noted a conceptual framework model first proposed by Milanowski and Odden (2007). Figure 1 describes the cost of losing a teacher in terms of recruitment and training of new hires, as well as the cost of productivity in terms of time lost throughout the process. Additionally, many districts which offer signing bonuses and other incentives to attract teachers must repay that money with each new hire, essentially throwing away money which could have been used in the school or district budget (Watlington et al., 2010).

![Figure 2.1. Conceptual Framework of Turnover Costs](image_url)

(Sources: Watlington et al, 2010; Milanowski & Odden, 2007)
Teacher Shortages in North Carolina

The state of North Carolina is no stranger to issues of teacher retention, which has been a focal point of research for several decades (Schlechty & Vance, 1981; Richardson, 2017; Farrelly, 2018). Teacher turnover in North Carolina is at an all-time high in high-needs content areas such as math and science as well as in those content areas which are typically easy to fill, such as elementary education (Barth, Dillon, Hull & Higgins, 2016). In 2003, the North Carolina Department of Public Instruction predicted they would face a minor shortage of less than two percent of teachers by the year 2013 (Murphy, DeArmond, & Guin, 2003). Unfortunately, a study conducted during the 2015-2016 school year showed that more than 14.8% of jobs were unfilled, which is an increase of 33% since 2011 (Barth et al., 2016).

An overwhelming 53.3% who chose to leave North Carolina public schools in the 2015-2016 school year cited “Personal Reasons” (NCDPI, 2016) for their departure. Noted personal reasons for leaving NC public schools included family relocation, career change, and leaving to teach in other states. North Carolina’s lacking competitiveness with other states is not a new issue; North Carolina ranked 44th out of 50 states and Washington, DC in average teacher salary during the 2015-2016 school year, and ranked 42nd in per-pupil expenditure (NEA, 2017).

Support for teachers is also a major issue facing North Carolina schools. A school climate survey of North Carolina teachers noted that teacher retention could be best anticipated by their perception of school leadership (Ladd, 2009). School leadership plays a vital role in determining the support community within the school and the greater public (Boyd, Grossman, Ing, Lankford, Loeb, & Wyckoff, 2011).
Factors Influencing Teacher Attrition & Retention

There are many factors which influence a teacher’s decision to remain in the classroom (Chestnut & Burley, 2015), and often more than one factor plays a role in determining whether a teacher will remain in the classroom for the length of their career. Some research has looked specifically into the external stimuli which impact decision making in teachers (Zhang & Zeller, 2016). While factors such as salary, benefits, and financial/family obligations are not to be overlooked, they are often not the external factors teachers cite in their reasons for leaving the profession (Thibodeaux, Labat, Lee & Labat, 2015).

In the state of North Carolina, for instance, teachers who are leaving the profession may indicate one of twenty-eight options for departure upon leaving their local school district (NCDPI, 2015). Of those twenty-eight categories, “Personal Reasons” is among the top reasons reported every year. However, in-depth studies have noted that teachers cite many of the same reasons for leaving—lack of administrative support, negative school environment/working conditions, and unmanageably high levels of stress (both professional and personal) caused by the job—which made remaining in the profession unappealing or nearly impossible (Burke, Schuck, Aubusson, Buchanan, Louviere & Prescott, 2013; Darling-Hammond, 2007; Ingersoll & Perda, 2010; Tamir, 2010). This is particularly true in areas of high economic distress, as teachers in high-poverty rural or urban areas are more likely than their suburban counterparts to leave the profession before the completion of their first five years (Goodpaster, Adedokun, & Weaver, 2012; Hodges, Tippins, & Oliver, 2013; Monk, 2007). Additionally, teachers of science and/or mathematics, as well as those who
Teach students with special needs, are at the highest risk for leaving the profession due to these factors (Goldhaber, Krieg, Theobald, & Brown, 2014).

Interestingly, many of the external factors which influence teacher retention or attrition also play a key role in the development of teacher identity (Thibodeaux et al., 2015). Teacher identity, which is explained in greater detail in the section below, encompasses how a teacher views themselves and their role within a professional context (Volkmann & Anderson, 1998). These factors, such as support, environment, and stress/emotional response, are internalized in the teacher and can influence their beliefs about their teaching abilities, also called self-efficacy (Ahmad, 2011). A body of research has looked into the reasons why teachers stay or leave (Grissom, Hodges et al., 2013; Guarino, Santibanez, & Daley, 2006; Imazeki, 2005; Liu & Ramsey, 2008; Viano, & Selin, 2016), and much research has investigated teacher identity development (Avraamidou, 2009, 2014; Beauchamp & Thomas, 2009; Gee, 2000; Ingersoll & May, 2010; Volkmann & Anderson, 1998). However, much more is to be done in order to demonstrate correlation between the characteristics of teacher identity and how that identity shapes decisions regarding career longevity.

Teacher Identity Development

What is Identity?

Though widely discussed in research, the concept of identity is one which has never been concretely defined. The term identity is prevalent in many fields, including sociology, psychology, history, and education. Though from many backgrounds, most scholars agree that identity must be conceptualized by an individual, and can include their view of themselves within various groups (Fearon, 1999; Hogg & Abrams, 1988).
In the early years of identity research, it was not uncommon for studies to focus on identity theory around two positions: 1) the identity of the individual or 2) the identity of the individual as part of a group. Sigmund Freud, an often criticized but also revered neurologist, initiated the discussion of identity in 1923 as a byproduct of his famous Psychoanalytic Theory of Personality (Holt, 1989). In this theory, Freud describes the id, ego, and superego, which dictate an individual’s responses to every situations and experiences. While many aspects of his research have been disputed, the bedrock on which he developed his theory has lead to over three million publications concerning identity research across countless fields.

Using Freud’s theory, Erik Erikson began postulating theories which serve as a foundation for modern day identity research (Fearon, 1999). Erikson describes identity (the concept of “Me”) as being developed by the id (the concept of “I”) (McAdams & Zapata-Gietl, 2015). In Erikson’s description of identity, the concept of “I” shapes the concept of “Me” through experiences and internalization of those experiences (Erikson, 1959). For instance, if “I” was born in the United States, “my” identity is of that of an American. What is not clear, however, is how the various aspects through which identity can be viewed can be simplified to create a distinct definition. Therefore, social scientists have studied identity in through many lenses in order to gain insight into who and why we, as people, are the way we are. Erik Erikson describes the concept of identity an individual’s projection of what they “want or need to see” within themselves (McAdams & Zapata-Gietl, 2015). This conceptualization can be altered, as more recent research has posed, through social interactions, and is not made of concrete characteristics for any particular individual (Stets & Burke, 2000; Strauss, 2017).
Humans are social creatures who depend on the interactions of others to determine their place in communities of all sizes (Alsup, 2006). In today’s global society, identity becomes more of a grey area in terms of conceptualization of place among other individuals, within groups, or even within oneself. Laura Leve (2011) describes this as an anthropological phenomenon in which our global outreach has altered the consensus on human nature. Therefore, understanding what identity is and how it shapes the lives of individuals has become increasingly complex over the past several decades.

It was Gee (2000) who determined one’s identity is not solely recognized in their social interactions (Stryker, 1980) or via self-verification due to internalization of information (Burke, 1991). While Stryker and Burke (2000) recognized the need for each of their theories to help support the other, James Gee noted four views of identity which encompass both social interaction and internalization to develop the whole person. For the purpose of this research, Gee’s theories of identity are reviewed in depth as a lens through which to view teacher identity research.

**Gee’s Four Views of Identity**

In his research on identity, Gee determined that various aspects of a person’s life—from those things which they were born with to those which were learned/social behaviors—must be acknowledged when determining the type of person on “is” or “is not.” Gee’s four views of identity begin in discussing those aspects of an individual which are guided by nature. Natural-identity (N-identity) encompasses all of the characteristics of an individual which are prescribed at birth or later in life without the being acted upon by a societal force. Race, ethnicity, gender and birth order are examples of parts of N-identity with which one must recognize before beginning to understand who they are as a person. Since society
cannot influence these factors, this aspect of identity is static. Despite this fact, how a teacher responds to issues surrounding their N-identity are critical in the development of their teacher identity. Socioeconomic status, religious beliefs, and geographical location, while often imposed on one at birth, are not part of N-identity, as they are fluid and can be changed by the individual or outside forces.

Issues surrounding natural identity in the classroom are most often associated with racial and/or cultural bias. These biases can lead to disruptions in the learning environment, particularly if the teacher and student come from different racial or cultural backgrounds (Lindsay & Hart, 2017). Natural identity is a deeply personal form of identity, as it shapes an individual’s perception about where they belong in society; and for teachers, issues of race, gender, or sexual orientation can shape their perception of their effectiveness in the classroom (Durden, Dooley, & Truscott, 2016).

Next, Gee discusses Institution-identity (I-identity). This facet of identity is framed around one’s interactions with authority figures within institutions. At all points in life, individuals have roles which require the authority of others. For instance, children are under the authority of their parents, employees of their bosses, and prisoners of the prison guards. While the experiences of these scenarios are all unique, they create an identity which is formed by others without necessarily being reflective of the internal beliefs of the individual. Gee mentions that prisoners may feel imposed upon by the authorities at the prison because they do not choose to be incarcerated. Employees who love their jobs, however, may view their role as a calling, which would foster positive development of their I-identity. As one individual can serve in many roles, these identities are varied in one individual through multiple contexts.
The third category in which Gee describes the development of an individual’s identity is through discourse (or dialogue) with others. This is referred to as the Discursive-identity (D-Identity). D-Identity refers to how an individual perceives themselves based on interactions with others, particularly within their peer group or in highly social settings. In studying teacher identity, D-identity becomes an incredibly important focal point; the interactions a teacher has with their colleagues, students, and administration has been shown to be a major contributing factor to overall job satisfaction and confidence in the classroom (Lasky, 2005; O’Conner, 2008; Lotter et al., 2016). D-identities in teachers may come from their individual abilities or achievements, for instance, in the case of a teacher who has been recognized for outstanding classroom management or high test scores. For others, the D-identity can be ascribed to them not through their own actions, but by the perception of others. For instance, if a teacher has traditionally had classes that perform very poorly, despite their best teaching efforts, the teacher may be ascribed as an underperforming teacher—even if the results are due to a combination of a lack of available resources, little parental support, or a high number of students with special needs. Competing discourse, whether within one’s beliefs regarding their ability or from competing agencies (such as government/local policies), can interrupt how identity within a teacher develops (Sachs, 2010). One’s perceived role based on the interactions of others is an incredibly powerful force regarding developing identity, especially in a social career such as teaching (Alsup, 2006; Rodgers & Scott, 2008). D-identity can be fostered by intentional classroom conversations which can create a bridge between the private universe and a greater community of practice (Richards, 2006).
Gee’s final criteria for identity development focuses on what he refers to as the “affinity perspective” or Affinity-identity (A-Identity). This A-identity describes how shared experiences with a group of others with similar interests or goals creates an atmosphere for an individual to be their “true self.” In the instance of teacher professional identity, it is imperative to understand how fitting within a group fosters a sense of belonging in the school environment and profession (Walkington, 2005). Participation in affinity groups provides an opportunity for teachers to learn from and grow with one another. Etienne Wenger (1999) discusses identity within a community of practice, a group in which members acknowledge their belonging as well as the membership of others within their group. According to Wenger, these acknowledgements can be verbal or non-verbal, and often one’s actions indicate how they are resolving their feelings about their place in the community. Learning from others is also key in development of an A-identity in teachers; as novice teachers begin to learn how to “become” a teacher, their participation within the school’s affinity groups will move them towards full participation in the profession, moving them towards an identity of a master practitioner (Lave & Wenger, 1991).

Teacher Identity

Professional identity is an integration of personal and career-specific roles and beliefs (Beauchamp & Thomas, 2009) which mold how one views themselves within the context of their career (Sutherland, Howard, & Markauskaite, 2009; Volkmann & Anderson, 1998). According to Faber (2002), professional identity (for any profession) develops on a continuum (see Fig 1) when the following three criteria are met:

- The professional has a relationship with an audience specific to their field
- The professional has specific social responsibilities within and outside the workplace which relate to their field.

- The professional is self-conscious and reflective in regards to how to maintain their professional status.

*Figure 2.2. Gee’s Four Views of Identity*

Professional identity in teachers develops just as it does in other professionals—within a unique context of school environment and interaction among teachers and the stakeholders of the school; and how those interactions are internalized by the teacher (Ruohotie-Lyhty, Moate, 2016). Teacher identity is complex and often difficult to understand without investigating multifaceted definitions of self (Henry, 2016). To define teacher identity has proved problematic for many researchers due to the dynamic and fluid nature of identity, especially in teachers (Akkerman & Meijer, 2011; Beauchamp & Thomas, 2009). This postmodern idea of discontinuity in identity makes researching teacher identity
particularly challenging, as there is not stable definition of identity through which any one individual teacher can be compared to another (Beauchamp & Thomas, 2009; Beijaard, Meijer, & Verloop, 2004). Though complex in nature, when a teacher possesses an understanding of their own perception of their professional identity, they are more likely to be accepting of change, willing to innovate their practices, and developing a stronger sense of self-efficacy than those who are not aware of their professional identity (Beijaard, Verloop, & Vermunt, 2000; Caninus, Helms-Lorenz, Beijaard, Buitink & Hofman, 2011).

Teacher identity is positioned in the context of a teacher’s school environment and how they interact with others in response to their position. For this reason, a positional identity framework is important for understanding how teachers determine the value of their roles. Positional identity is described as an individual’s sense of social position in their day-to-day lives (Holland, Lachicotte & Skinner, 1998). This framework describes how identity can be influenced by multiple contexts, including the roles of social interaction and an individual’s position within particular communities (Moore, 2008). Positional identity relates strongly to teacher emotions, as the framework initially supported social justice topics such as race, gender, and religion (Riveria-Malucci, 2013). Therefore, positional identity theory fits well with N-Identity research. The emotional response elicited by teachers from experiences within their school environment influence their teacher identity as well as pedagogical decision making (Keltchermans, 2005).
Little research has been conducted on the process through which teacher identity development takes place (Volkmann & Anderson, 1998), but the impacts of teacher identity on other educational research topics such as job satisfaction, retention/attrition, relationship development, self-efficacy, and pedagogical content knowledge (PCK) have been widely researched in nearly all academic settings and across multiple curricula (Lasky, 2005).

Akkerman and Meijer (2011) sum up teacher identity development from within the greater body of research on teacher identity. In their discussion of teacher identity conceptualization, they discuss that much research has found there to be many ‘sub-identities’ within one teacher’s identity. The concept that teacher identity is an umbrella under which many other sub-identities would be present is not uncommon; teachers are often categorized based on their knowledge of content, pedagogy, and didactical expertise (Beijaard et al., 2000).

**Teacher Identity and Emotion**

Teacher identity develops and evolves throughout the course of one’s experience in the classroom. Aspects of personal identity can provide such strong influence over an individual that it can even persuade them to the profession (Dominguez, Viviani, Cazetta, Guridi, Faht, Pioker, & Cubero, 2015). Brad Olsen (2008) discovered that gender stereotypes

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**Figure 2.3. Professional Identity Continuum, according to Faber (2002)**

<table>
<thead>
<tr>
<th>Specific Audience Relationship</th>
<th>Social Responsibility</th>
<th>Ethical Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>(specific and known audience)</td>
<td>(maintain life of wider society)</td>
<td>(maintain status of profession)</td>
</tr>
<tr>
<td>• communicate for specific audience</td>
<td>• influence social values</td>
<td>• enforce knowledge monopoly</td>
</tr>
<tr>
<td>• advocate on behalf of audience</td>
<td>• enact leadership roles</td>
<td>• enforce service monopoly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• self-regulate conduct</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• advocate for status</td>
</tr>
</tbody>
</table>
and prescribed gender roles (such as motherhood duties) were huge determining factors for the majority of his participants who found themselves in the teaching profession. Teachers choose to enter the profession for a myriad of reasons; however, many studies have shown that teacher identity begins to develop during pre-service (college) exposure to the profession (Castaneda, 2014) and begins to change more rapidly during the early years of a teacher’s career (Beijaard, Meijer, & Verloop, 2003).

One highly researched area of teacher identity focuses on teacher emotion. Interest in a subject often elicits an emotional response (Renninger & Su, 2012), which is a factor of motivation to begin or continue an action. For teachers, emotional connectedness in the profession can be a determining factor for overall satisfaction and can place an emphasis on whether they become effective practitioners (Kunter & Holzberger, 2014).

Emotional stress creates a multitude of issues for teachers when developing their identity. Because of the high demands of the teaching profession, emotional labor can drive teachers to view their profession in a negative light—and even lead to mental and physical duress as well as professional burnout (Schutz & Lee, 2014). High levels of stress, even for those who are satisfied with their jobs, has major consequences for which coping is not always easy (Skaalvik & Skaalvik, 2015). For many teachers, positive interactions with students will foster a positive identity within the classroom, but negative interactions will have a negative effect on identity development and can lead to an unstable view of the teacher’s role within the profession (Schutz & Lee, 2014). These negative experiences can be particularly damaging, as many teachers identify their personal “self” within the context of their role as a teacher (Nias, 1996). In a foundational study of teacher emotion, it was found that teachers’ emotional responses to situations have been shown to have direct impact on the
emotional response students show in the classroom (Salzberger-Wittenberg, 1999) as well as how teachers make informed curricular decisions (Zembylas, 2003).

The development of relationships with students is vital in the development of teacher identity (Hargreaves, 1998; Nias, 1999; O’Conner, 2008). Some teachers become so emotionally invested in their work and relationships with their students that they will choose to remain in a job which can sometimes cause emotional distress or burnout on part of the teacher (Hargreaves). One teacher in a study conducted by O’Conner (2008) described the process of caring for children as a motivation to remain in the profession as well as a “terribly exhausting professional demand” (p. 125).

**Teacher Identity & Science Content**

Teacher identity within the field of science presents unique circumstances not necessarily shared with teacher identity in other content areas. From elementary educators to college professors, the struggle with identity of “scientist” versus identity of “teacher” is widely discussed (Aydeniz & Hodge, 2011). College science professors, for example, are often encouraged to overlook research-driven pedagogical practice in place of lecture style instruction, as the emphasis should be on the sciences as opposed to the teaching (Aydeniz & Hodge). Elementary school educators often focus on instruction but can lose site of the importance of science content (Carrier, Whitehead, Walkowiak, Luginbuhl & Thomson, 2017). For secondary (middle and high school) science teachers, there are several factors which influence their identity as scientists, including content choice, PCK, and professional development.

To categorize a secondary science teacher as a “science” expert is to assume that all science educators come equally prepared to teach in all content areas. Most science teachers,
particularly in high schools, focus their area of expertise around one content area. Content choice relates strongly to a teacher’s experiences prior to entering the classroom and makes up a part of who they are by framing the type of teacher they want to become (Helms, 1998). The identity of teacher versus scientist can place a strain on the identity of secondary science teachers, as classically trained teachers often feel intimidated or unprepared to do “real” science (Faber, Hardin, Klien-Gardner, Benson, 2014). Faber et al. discovered with opportunities for engagement in immersive research environments, teachers began to quickly identify with the laboratory and research components of scientific practice, making it possible for them to make connections between content research and content teaching. Increasing expertise and teacher self-efficacy provides teachers with a sense of confidence in their content, regardless of other factors (Mensah, 2016).

Science teachers’ use of inquiry-based teaching practices are linked to the science teachers’ identity (Avraamidou, 2014) as well as their PCK (Lakin & Wallace, 2015). Inquiry-oriented teachers emphasize the importance of investigation as a means of learning in the science environment (Bryce, Wilmes, & Bellino, 2016). For those teachers who lack confidence, content knowledge, or pedagogical ability, inquiry-based environments will be much less prominent (Avraamidou, 2014). Since this type of instruction relies heavily on the questions, ideas, and investigations by students, teachers who do not identify as content area experts will shift the focus of the class to teacher-delivered instruction (Eick & Reed, 2002).

Professional development for pre-service and in-service science teachers is one tool through which teacher identity in the science fields can be fostered (Bryce, Wilmes & Bellino, 2016; Derenoff, 2013; Moore, 2008; Supovitz & Turner, 2000; Wink, Ellefson, Nishmiura, Perry, Wenzel, & Choe, 2008). Professional development opportunities are often
mandated at a school-wide or district level, while other programs are implemented for all teachers across a given state/region. Teachers, particularly those who ascribe to the idea of being “lifelong learners,” can identify both as student and teacher—which is why professional development is essential in continual development of teacher identity (Castenada, 2014).

**Professional Development in North Carolina Schools**

Several systemically-mandated and voluntary programs are in place to support teacher development, pedagogy, content, and access to resources in North Carolina and across the country. Two of these programs which are widely utilized in North Carolina’s schools are designed to increase teacher reflection on classroom practices, behavior management, PCK, and, ultimately, to foster the development of strong teachers who will remain in and better the profession.

The first of these programs is the North Carolina Beginning Teacher Support Program (NCBTSP). For teachers in North Carolina who have not received professional licensure status, the NCBTSP provides three years of mentoring with a veteran teacher (usually within the same content area) to provide support and guidance for the novice teacher (Hobbs & Putnam, 2016). This program has been the topic of several doctoral dissertations within the state of North Carolina (Beatty, 2016) but has had very little review in terms of widely-published, peer-reviewed research. Much more research on the effectiveness of this specific mentorship program is needed. In general, research has shown that mentorships are incredibly important in influencing (both positively or negatively) the beginning teachers’ level of confidence (Izadinia, 2015).
The second highly popular program to aid in teacher identity development is a certification which teachers from across the country seek to achieve—and North Carolina has the highest number of those who reach the milestone. The National Board Certification process is a rigorous, three-year long program of closely reviewing one’s pedagogical practices (via reflections, video-taped lessons, etc.), and showing just cause as to why the demonstrated teaching practices demonstrate mastery of the profession. Nationally Board Certified Teachers (NBCTs) are among an elite group of veteran educators who should, by design of the program, have a firm grasp on what it means to be a teacher and how effective teachers operate in the everyday classroom (Goldhaber, Perry & Anthony, 2004). Yearly, only forty percent of all who apply for their National Boards receive the certification, yet North Carolina schools produce the most NBCTs of any other state in the nation, with over two times the number of NBCTs of California, New York and Texas combined (nbpts.org).

For teachers in North Carolina, the reasons could be classified in both the aforementioned internal and external factor categories. The reflective process which increases teacher awareness of their pedagogical practices and own self efficacy are motivation for some in creating the best possible learning environment for their students (Beauchamp, 2014). For others, however, NBC is the only route currently in which veteran teachers can increase their pay. Along with the prestige of being a NBCT, a yearly stipend of 12% the base salary is provided to recipients for every year they hold the certification (which must be renewed every ten years). North Carolina recently took away the option for advanced degree (Masters or Doctoral) pay for teachers who received their degrees after 2013, and lower-than-average teacher salaries are already a hot button issue in the realm North Carolina politics. While many teachers may benefit from the NBC process, it is
unclear as to whether their motivation for receiving the intensive certification, which parallels some graduate programs in terms of workload, is purely based on professional and identity development, or if the motivation is more simply the huge financial incentive.

**Gaps in the Literature**

Much research has focused on identity development in pre-service and beginning teacher identity (Flores & Day, 2006; Lamote & Engels, 2010; Pillen et al., 2013; Timostsuk & Ugaste, 2010), as well as identity in elementary teachers (Danielsson & Warwick, 2013; Sloan, 2006; Troman, 2008). Very little research has been conducted regarding the development of identity in middle level educators (Coward, Matteson, & Hamman, 2012), and research lacks emphasis on mid- and late-career teacher identity as opposed to that of beginning teachers. This is problematic when attempting to understand the influence of identity on long-term teacher retention; therefore, more attention should be given to this topic in order to understand the connection between these two distinct areas of research.

This research study is designed to address these literary gaps. Due to the lack of research available on the topics of mid- and late-career teacher identity, it is difficult to posit theories as to how identity influences retention within these subgroups. With this study, I begin a dialogue regarding the importance of researching teacher identity in career teachers, as well as to investigate how those identity factors may be impacted by effective professional development.

**Summary**

In this chapter, I have presented an in-depth background of identity as well as the current data on the state of teacher retention and attrition at a national and state level.
Additionally, I have discussed the gaps of knowledge within this particular facet of teacher identity research. In the next chapter, I discuss the methodology employed for this study.
CHAPTER III: METHODOLOGY

The purpose of this study is to further research on teacher identity and retention. Through the analysis of in-depth interviews, this study identifies what factors of teacher identity play a role in a teacher’s decision to remain in the classroom and explores professional development methods which foster the growth of those identity characteristics in mid- and late-career science teachers. Two research questions informed this study:

1. What are the teacher identity characteristics of mid- and late-career teachers which may influence their decision to remain in the profession?
2. How do professional development programs impact the identities of North Carolina science teachers and their decisions to remain in the classroom?

In this chapter, I introduce the methodology through which this study was designed, including researcher positionality, epistemological foundations, theoretical frameworks, and data analysis. This study received approval from the North Carolina State University Institutional Review Board in July, 2017.

Researcher Positionality

As a former science educator in North Carolina, I am aware of my own biases and beliefs regarding science teacher retention and teacher identity. Therefore, it is important to establish my positionality in terms of this research study. First and foremost, it is important to note my familiarity with the participating districts in this study. Twenty teachers representing seven North Carolina school districts took part in in-depth interviews. Of those seven districts, I am personally and professionally familiar with teachers and schools in four districts. I have had professional interactions with seven of the twenty teachers in this study, two of whom I worked with closely through various organizations. I viewed my professional
relationship with these participants as a benefit for the study, as I could relate to their experiences; also, I feel as though they were more forthcoming with their answers than they may have been otherwise. To maintain trustworthiness, as I discuss later in this chapter, an outside coder helped to establish codes and themes to ensure interrater reliability for these particular interviews.

Additionally, I am aware of my biases regarding teacher attrition and professional development. While teaching, I served as a mentor and professional development leader; many of the frustrations I experienced in those times are sentiments which have been echoed by participants in the study. Understanding this, I ensured the research questions were designed using research-backed theory and were peer reviewed prior to submitting this study to the Institutional Review Board at NC State. As a white female, I do not feel as though my race, gender, or other natural identity factors influenced this study, though these natural identity characteristics were of great importance for many of the underrepresented participants.

**Research Design**

I chose to use a qualitative interview study as described by Kvale (1996) for this study. In order to design interview questions which would align with the research questions, I used context from phenomenological research (Creswell, 2013). The purpose of this interview study is to “obtain descriptions of the life world of the interviewee with respect to interpreting the meaning of the described phenomena” (Kvale). Twenty middle and high school science teachers participated in at least two semi-structured, one-on-one interviews. Semi-structured interviews allow participants to provide a narrative not usually addressed in
structured interviews. Therefore, some participants were more forthcoming with information regarding specific questions.

Interview studies employ one of the most basic styles of interaction among humans: conversation (Kvale, 1996). Interviews, particularly those which engage participants into discussing the narrative (or story) of their experiences, bring into reality the historical context of the individuals’ experience as well as an insightful explanation regarding their response within a given situation (Muylaert, Sarubbi, Gallo, Neto & Reis, 2014). Each individual, even during a shared experience, will develop their own thoughts, feelings, and rationale regarding the occurrence and how it shapes them. This idea that individuals can host multiple perspectives (Guba & Lincoln, 1994) makes interviews an established and highly-used methodology for gaining rich and robust data (DiCicco-Bloom & Crabtree, 2006). For these participants, the perception of reality which has shaped their opinion of the teaching profession and teacher identity are derived from social interactions within and outside of the school environment. For this reason, the epistemological theory of social constructivism informs this research study.

The theory of social constructivism states that all knowledge is constructed through interactions with others, as knowledge is socially situated. Vygotsky (1978) proposed the idea of social constructivism as an epistemological foundation for learning. However, identity development and learning are greatly linked, as an individual’s understanding of their identity is developed through social interactions and construction of their own perception. For teachers, identity development occurs through experiences within highly social environments and involves interaction with administrators, colleagues, students, and the community. Teachers then self-assign their identities based on their interpretation of
these interactions and internalization of their perceived social position. This relative social position describes *positional identity*, which is a theoretical framework which is used in this study to support Gee’s identity framework.

Positionality stems from the multiple contexts through which an individual experiences life. The original theory of positional identity proposed by Holland et al. (1998) is often used to describe experiences related to race, gender, religious belief, and other socio-political contexts. Positional identity can also be used to describe how an individual internalizes their day-to-day interactions beyond race, gender, or ethnicity (Moore, 2008). Because much of the literature surrounding positional identity concentrates on issues of social justice, Gee’s (2000) description of identity is used to support this framework and how teachers position themselves within their narratives.

This is particularly true for Natural Identity and Affinity Identity. Natural, which includes such criteria as race and gender, speaks to the initial understanding of positional identity. While teacher identity development is dependent on social interaction, characteristics with which a person is born (such as race, gender, sexual orientation) inform those interactions and will elicit particular emotional responses. Additionally, teachers are placed into and volunteer for affinity groups within their schools. These groups are important for developing a sense of belonging and positioning oneself into roles within the school community.

**Participant Selection**

Twenty science teachers from secondary (middle or high school) backgrounds were selected to participate in this research study. Upon receiving permission from administrators at the district and school levels, teachers were contacted via email to request their voluntary
participation in at least two in-depth, one-on-one interviews. Twenty-four teachers responded to the request, three of whom did not meet all selection criteria and one of whom did not respond to follow up emails. In order to meet selection criteria for this study, participants must meet these standards:

- Have six or more years of classroom experience (public or private)
- Teach science content for at least 50% of the work day
- Currently teach in a public middle or high school in North Carolina

If greater than twenty participants were selected, preference would be given to participants who have completed National Board Certification and those who have participated in any capacity with the North Carolina Beginning Teacher Support Program. Purposeful maximal sampling (Creswell, 2012) was utilized to ensure teachers were from the appropriate backgrounds according to the criteria and to increase insight from diverse viewpoints.

Of the twenty participants selected, ten are classified as “mid-career” teachers, having between six and fourteen years of experience; the other half, who have fifteen or more years of experience, are classified as “late-career.” The criteria cut off for classification as a mid- or late career science teacher was intentional; although six years in a profession could logically be categorized as early career, teachers in North Carolina are only classified as “beginning teachers” for three years, and no longer maintain a provisional license after four years. For this reason, in terms of teacher classification, some of the participants who are classified as mid-career could also be described as “non-beginning teachers.” Those who have fifteen or more years of experience are classified as late career, as they have made it to or beyond the half way point of a thirty-year career and are often held to expectations and standards that their less experienced colleagues are not. All the teacher participants are
familiar with the North Carolina Beginning Teacher Support Program, although some did not participate as beginning teachers themselves. The majority of teachers interviewed are Nationally Board Certified, are currently pursuing certification, or have attempted (but did not attain) certification in the past. Twelve participants have advanced degrees in education or a branch of science. Two teachers have degrees in elementary education with a focus in science; the remaining eighteen participants are certified in middle grades or secondary science. The participants average 13.2 years of experience as science teachers, with a median 11 years of experience.

The majority of participants belong to ethnic and gender majorities within education: white women make up fifty percent of the interviewees, while male teachers of color are not represented in this study. White male teachers are the next most represented group, making up thirty-five percent of participants. African American females make up only ten percent of the interviewees, while Asian American females are the least represented minority group, at only five percent.

Male teachers of color are drastically underrepresented in American education (Billingsley, Bettini, & Williams, 2017) and are not represented in this study because of limited availability to schools/districts with science teachers who fall into the categories of both minority and male who also volunteered for the study. Participant demographic information is described in Tables 3.1 and 3.2. Additionally, brief descriptions of each participant are provided to give insight into their positional identity as it applies to their teacher identity at the time of the study.
Table 3.1.

**Demographic Breakdown of Participants**

<table>
<thead>
<tr>
<th></th>
<th>Mid-Career (6-14 years)</th>
<th>Late Career (15+ years)</th>
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<tbody>
<tr>
<td>Male</td>
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<td>3</td>
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<tr>
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<td>5</td>
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<tr>
<td>Non-White</td>
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<tr>
<td>Advanced Degree (Masters/Doctoral)</td>
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<tr>
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<td>5</td>
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<tr>
<td>Suburban School</td>
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<td>2</td>
</tr>
<tr>
<td>Urban School</td>
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</tr>
</tbody>
</table>
Table 3.2.

Participant Demographic & Employment Information (alphabetical by pseudonym)

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Gender</th>
<th>Ethnicity/Race</th>
<th>Years of Experience</th>
<th>Degree Earned</th>
<th>NBCT</th>
<th>Grade Level</th>
<th>School Type</th>
</tr>
</thead>
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<td>White</td>
<td>15</td>
<td>Doctorate</td>
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<td>HS</td>
<td>Rural</td>
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<tr>
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<td>White</td>
<td>11</td>
<td>Bachelor</td>
<td>In Progress</td>
<td>MS</td>
<td>Suburban</td>
</tr>
<tr>
<td>Bree</td>
<td>Female</td>
<td>Asian</td>
<td>8</td>
<td>Masters</td>
<td>Yes</td>
<td>HS</td>
<td>Urban</td>
</tr>
<tr>
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<td>9</td>
<td>Bachelor</td>
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<td>8</td>
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<td>Rural</td>
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<td>Urban</td>
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<td>Mitchell</td>
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<td>Rural</td>
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<tr>
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<td>African American</td>
<td>11</td>
<td>Masters</td>
<td>Attempted</td>
<td>HS</td>
<td>Rural</td>
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<tr>
<td>Rachael</td>
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<td>White</td>
<td>25</td>
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<td>Suburban</td>
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<tr>
<td>Sandra</td>
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<td>White</td>
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</tr>
</tbody>
</table>
Participant Profiles

Adam

A self-described family man, Adam comes from a family of education professionals. Choosing to teach was an easy decision once he gained experience in working with museum programming while pursuing his undergraduate degree. Upon graduation, he returned to his home school district and began teaching middle, and later high school, science courses. Adam had considered leaving the profession due to feeling undervalued by the school district upon finishing advanced degrees, both a Master’s and Doctorate in Science Curriculum. He did not, however, want to leave the community where he grew up and was now raising children of his own. He has since accepted a position in a brand-new school as lead science teacher for a high school clean energy program. Adam does not plan to leave the school system and enjoys his new position and time in the classroom. He is not opposed to the idea of moving into leadership roles within the new school community, even if it means teaching fewer courses.

Brad

Brad did not realize he wanted to be a teacher until friends and family pointed out how much he enjoyed describing weather-related phenomena to others. With a degree in chemistry, Brad decided to pursue a lateral entry science position at an area middle school and has now been teaching for eleven years. He describes the career as his calling and is able to overcome challenges by recalling his unhappiness in his previous career in a chemistry laboratory. Brad’s outlook on education “optimistically practical.” He believes pre-service teachers should be better prepared when they enter the field for challenges they will face while also understanding the impact positive interactions with students can make.
Bree

With eight years in the classroom, Bree has taken leadership roles very seriously. Serving as her school’s STEM Coordinator added a layer of stress to Bree’s work environment. This position takes her out of the classroom for one period a day, where she serves alongside administration to create and implement school-wide STEM reform. While she enjoys the leadership opportunity, she worries her role creates a divide between her and the other STEM faculty. Bree enjoys her job and can see herself retiring as a classroom teacher. After our interviews, Bree left her position to accept a full-time teaching position at a neighboring area high school.

Courtney

Courtney is a seventh-grade science teacher at a medium-sized, rural middle school with high teacher turnover. She describes her job as one of convenience, deciding to enter the teaching profession after learning her oldest son was living with Autism. Due to the special nature of his educational experience, Courtney decided being in the classroom would be helpful in gaining better understanding of his needs. After nine years in the classroom, Courtney is undecided of her future in education, primarily because it wasn’t her “dream job.” She has considered going back to school to study nursing now that her oldest son is in high school.

Danielle

Danielle began her teaching career as a sixth-grade science teacher and discussed in depth the positive impact that experience had on her views of education, teamwork, and support necessary for teacher success. As a mother of two, Danielle has developed a passion for helping children who do not have resources or support at home. She views herself as a
role model in the school community and considers it important to set a positive example for her students, particularly students of color. It is her belief that, as an African American woman, she owes it to herself and her students to demonstrate how women (especially women of color) can engage in science content and become successful in multiple fields of STEM. One of the youngest teachers in this study, Danielle is passionate about education—but not necessarily about remaining in the classroom. During our initial interview sessions, Danielle was less convinced she would remain the profession through retirement. Shortly after our interviews ended, Danielle graduated with a Master’s Degree in Informational Technology and has since accepted a position working in higher education as a technology specialist.

**Dylan**

Dylan is an eighth-grade science teacher at a high-performing, suburban middle school. Dylan decided to become a teacher after first spending time as an in-home counselor for children and adolescents. He realized teaching was his calling and returned to college to receive a Master’s of Education in Middle Grades Science and Mathematics. His family was very supportive of this career transition, and Dylan felt it was the place he needed to be. At the beginning of his fourth year of teaching, Dylan decided to pursue his National Board Certification and planned to submit his portfolio shortly after our interviews convened. He believes the National Board Certification process has already improved his instruction and classroom practice and is excited about assuming more leadership roles within his school. While he does not know if he will remain in the classroom throughout his tenure, Dylan enjoys teaching and does not plan to leave the classroom any time soon.
Graham

In 1999, Graham began an undergraduate career at a large university where he studied civil engineering. He quickly decided the program was not the right fit for him and instead chose to enter a chemistry education program. He found his friends to be supportive of his decision, but his mother was decidedly against the idea of teaching as a profession. Fortunately for Graham, his aunt (who is also a teacher) is a great source of continued support. Graham lives outside of the upper-class beach community in which he teaches and enjoys being able to have professional and personal identities which do not always overlap. In order to keep his personal and work lives separate, he is careful about his interaction with students and parents, and he feels teachers should be particularly careful about their public image.

Haley

Unsure of her future in education, Haley is an eighth year AP Environmental Science teacher at a low-performing urban school. She does not ascribe to a teaching philosophy based around the content she teaches; rather, she feels that it is her duty to guide students into paths of success which fit their own needs. Shortly after entering the profession, Haley decided to pursue a Master’s Degree and her National Board Certification. With her newly assigned credentials, Haley feels as though her future is not in the classroom, but in educational research. Despite her desires to leave the classroom, Haley feels as though her role as a teacher is a very important part of her identity, both professionally and personally. She takes great pride in telling others she is a teacher, though she feels the profession is not often respected by others.
John

Prior to teaching, John worked in service roles with youth through private organizations. After job cuts, entering the teaching profession felt like a natural transition for him. John has been “teacher of the year” for his school on several occasions and believes the greatest recognition a teacher can receive is from students and their parents. John has extreme confidence in his ability to teach and plans to remain in the classroom through retirement. Being a mentor, both officially and unofficially, to beginning teachers is highly important to John. He appreciates the fact that many of them view him as a “wise father figure” and aims to create a “friendly environment” for his colleagues. John has attempted to receive National Board Certification on two occasions; however, he marginally missed the cutoff score each time. He views the process as being a “gimmick” and works to discourage other teachers in his school from pursuing the certification.

Laura

Like many of the participants in this study, Laura did not initially pursue teaching as a career choice. After completing her undergraduate degree, Laura worked for a major computer manufacturing company for eleven years. When she and husband decided to have children, Laura wanted to pursue a career that would allow her more flexibility in her schedule. Laura’s husband supported her as she left her six-figure salary to attend school full time and earn a Master of Arts in Teaching. After that, she began teaching at a private school where she stayed for sixteen years. When she and her family decided to relocate, Laura began teaching science in a public school system in North Carolina where she has been for five years. While the transition to public school was challenging, Laura describes it as being
worthwhile to have an impact on the lives of children who have vastly different experiences than her own.

**Lindsey**

Lindsey is a high school biology teacher at a large, rural high school outside of a major North Carolina city. Her students live in an area which was historically used for farming, but as the neighboring city expanded, many families and businesses moved into the area for affordable housing options. Lindsey enjoys teaching in the small community but purposely lives in the city in order to separate her private and work identities. A self-described overachiever, Lindsey enjoys challenging herself professionally and considers herself a school leader. With eight years in the classroom, Lindsey has served as a mentor teacher, a school leadership team member, department head, and is currently pursuing her National Board Certification. Teaching, she says, is something she is proud of, but is not her only role in life. At the end of our first interview, Lindsey stated, “Teaching is a big part of my identity, but it will never be my whole identity.”

**Matt**

Prior to entering the teaching profession twelve years ago, Matt received a Bachelor’s Degree in Atmospheric Sciences and worked for a major scientific co-op in Washington, DC. When budget cuts forced him out of his position, he began working at an ice cream factory while his wife finished her undergraduate degree in education. They made the decision to move to North Carolina, so she could find work, and while he was at a recruitment fair, Matt decided he would also go into teaching. Since entering the profession, Matt has received his Master’s Degree and National Board Certification. Matt describes his teaching style as “clinical,” and does not believe building personal relationships with students, parents, or
faculty is necessary for being an effective teacher. He does, however, feel that his parenting philosophies with his own children have been impacted by his classroom management strategies.

Meredith

Meredith’s experiences in the classroom differ greatly from anyone else in this study—and her identity as a teacher has been greatly impacted due to these experiences. Meredith came to the United States on a work visa to teach science in New York City. While teaching in a city borough, she experienced a violent sexual assault at the hands of one of her high school students. She considered quitting the profession then, but doing so would mean her work visa would be terminated and she would be deported back to Canada. Seeking support, she found no comfort in her administration, colleagues, or community. She felt isolated and began to have very strong, negative feelings toward the teaching profession. Fortunately for Meredith, the district she was working in laid off many teachers her second year, and she was able to transfer to a school in North Carolina. Because of her experiences, she chose to teach middle grades science instead of high school. Additionally, she only applied for jobs in schools with good reputations in areas of low need. In our final interview, Meredith mentioned that teaching at her current school is her “reward” for surviving an abusive and dangerous environment where teachers were not supported by administration or colleagues. She plans to remain in education for the foreseeable future but is open to leaving the classroom once she begins a family.

Mitchell

For Mitchell, becoming a teacher was a calling from a young age. The child of two educators, Mitchell knew he wanted to follow in his parents’ footsteps, but he did not know
what content he wanted to teach. By the flip of a coin, he decided to major in biology instead of history and became a biology teacher nineteen years ago. An avid athlete in high school and college, Mitchell knew he wanted to work in an environment where he could coach football. Coaching, according to Mitchell, makes a huge difference in the lives of children and is something in which he finds joy. He believes that sports and his teaching style in the classroom are both tools through which students can be motivated to do their best. As a Nationally Board Certified teacher with a Master’s Degree in Education, Mitchell also believes in working with colleagues who may benefit from his areas of expertise. This is particularly true for beginning teachers, and as a mentor teacher, he takes pride in his ability to help others.

Nicole

In her first three years as a teacher, Nicole taught biology in an inner-city school in a major metropolitan area in the Northeastern United States. After her husband was relocated, Nicole and her family came to North Carolina where she has taught at a very rural alternative school for eight years. Despite initial hesitation about teaching in an area so different than she was used to, Nicole enjoys her job and loves the relationships she has been able to develop with her students and colleagues. Nicole is an African American woman and a mother of two, both identities that she feels inform how she interacts with students and how her relationships have developed over her eleven years in the profession.

Rachael

Rachael is one of the most experienced teachers in the study, having completed twenty-five years as a middle-grades science teacher, with nearly twenty of those years as a Nationally Board Certified Teacher. The majority of her career has been spent at one of two
neighboring middle schools in a small, rural district in North Carolina. She has found her teaching experiences to be mostly positive, particularly regarding interactions with colleagues and students. As she is a mother, the concept of family is incredibly important to Rachael. She describes her relationship with others in her school as that of a “family” as well. Rachael does not plan to leave the teaching profession until retirement but does plan to retire as soon as she is able.

Sandra

Sandra has held a teaching license since 1993 but only began teaching eight years ago. Upon graduating from college, Sandra’s terrible experience with an administrator during her student teaching experience propelled her away from the teaching profession. Instead, she and her husband ran a successful business which they later sold when their oldest daughter was diagnosed with cancer. Knowing that they would have very high medical bills, and that insurance benefits for educators and their families are less expensive than paying for insurance outright, Sandra decided to return to her original plan—to become a middle school science teacher. She has been teaching eighth grade at a small, K-8 community school in a very rural area of North Carolina. Sandra plans to finish her career in the classroom.

Susan

Susan began her teaching career twenty-three years ago as an elementary school science and reading teacher. When she and a new administrator began disagreeing on school policy, Susan made the move to a local middle school where she has taught sixth grade science for seven years. Susan is confident in her ability to impact students’ academic and emotional development. The students, as stated by Susan, are the “only reason to teach.” She is, however, not satisfied with her current position. Four years ago, a new administrative
team took over the school. Prior to the start of that school year, the school also experienced a 52% teacher turnover. Many of the teachers who left went with the former principal, leaving many of the original staff members to develop new relationships under a new administrator. Susan disagrees firmly with many of the policies implemented by the new administrative team, particularly regarding treatment of faculty/coworkers. She now feels that she may no longer be a good fit for education and is actively pursuing new employment.

Valarie

Valarie is a Nationally Board Certified Teacher with twenty-one years of experience teaching environmental science. She has spent the majority of her career teaching at a very small high school in rural North Carolina. The total student body of her school has fewer than four hundred students, far less than any other school in this study. Valarie loves the small school environment as she can “really know” her students, their families, and the community. However, the size of her school proves to be a challenge when it comes to support from faculty or professional development. Each department has very few teachers; in fact, Valarie is one of only three science teachers in the school. For this reason, and due to the isolated area in which the school is located, the lack of professional development and collaboration can present unique challenges.

Virginia

Prior to entering the teaching profession, Virginia worked for nearly a decade as a trainer for high school and college athletes. While she enjoyed the work, the job requirements became too challenging once she had children of her own. She decided teaching might be a natural transition for her, so she began her teaching career in high school biology. Leadership, according to Virginia, is incredibly important. She is particularly concerned with
being seen as a leader for beginning teachers. Virginia notes that motherhood was what lead
her to the profession and is also the thing which has kept her in it. She views herself not only
as a mother to her own children, but as a “school mother” to each of the beginning teachers
with whom she works as well as a mother-figure to her own students. The students, according to Virginia, are the most important part of her job. Recently, Virginia was
diagnosed with breast cancer and was unable to be in the classroom for several months. She
was preparing to return to the classroom during our second interview and was most looking
forward to reconnecting with her students.

Participants’ School Profiles

In two instances, there were multiple participants at the same school. Interviews were
held outside of school hours to protect the identities of each participant and to ensure
complete anonymity. Participants were asked not to discuss their interviews with any
colleagues. During the 2017-2018 school year, each participant was teaching in a public
middle or high school. The North Carolina average turnover for the reporting school year
was 16.7% (NCDPI, 2018). This includes all teachers, not just those in high turnover areas
such as STEM and Special Education. Nine study participants taught at schools with turnover
rates higher than the state average, whereas eleven teachers worked in schools with lower
than average teacher turnover. Teacher turnover has been shown to directly relate to student
performance (Ronfeldt et al., 2013). Table 2 displays teacher turnover in each participating
school as it relates to the average science test score reported by the North Carolina
Department of Public Instruction.
### Table 3.3.

*Teacher Turnover and Science Assessment Scores at Participating Schools*

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<th>School &amp; Teacher Names (Pseudonyms)</th>
<th>Teacher Turnover Percentage (2017-2018)</th>
<th>School Science Assessment Data</th>
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<td><strong>Participating Schools with Low Teacher Turnover (&lt;16.7%)</strong></td>
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<td></td>
</tr>
<tr>
<td>James Madison Middle School (BRAD)</td>
<td>8.7%</td>
<td>1.6%</td>
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<tr>
<td>Ocean View Middle School (DYLAN)</td>
<td>9.8%</td>
<td>31.1%</td>
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<tr>
<td>South East High School (GRAHAM)</td>
<td>10.5%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Hillside Valley High School (JOHN)</td>
<td>11.3%</td>
<td>59.2%</td>
</tr>
<tr>
<td>J.K. Williams High School (LINDSEY)</td>
<td>8.9%</td>
<td>23.7%</td>
</tr>
<tr>
<td>Weeks Middle School (MATT)</td>
<td>12.6%</td>
<td>40.6%</td>
</tr>
<tr>
<td>Carver Magnet High School (BREE &amp; VIRGINIA)</td>
<td>13.8%</td>
<td>41.6%</td>
</tr>
<tr>
<td>Spencer Middle School (RACHAEL)</td>
<td>14.9%</td>
<td>51.8%</td>
</tr>
<tr>
<td>Old River School (K-8) (SANDRA)</td>
<td>5.4%</td>
<td>71.8%</td>
</tr>
<tr>
<td>Mountain Side Central High School (VALARIE)</td>
<td>13.3%</td>
<td>35.2%</td>
</tr>
<tr>
<td><strong>Participating Schools with High Teacher Turnover (&gt;16.7%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southeast Vocational and Career Center (ADAM)</td>
<td>Data Unavailable</td>
<td>Data Unavailable</td>
</tr>
<tr>
<td>Edward Price Middle School (COURTNEY, LAURA, SUSAN)</td>
<td>24.4%</td>
<td>58.4%</td>
</tr>
<tr>
<td>Valley Ridge Middle School (DANIELLE)</td>
<td>25.7%</td>
<td>67.6%</td>
</tr>
<tr>
<td>Sunnyvale High School (HALEY)</td>
<td>18.5%</td>
<td>56.4%</td>
</tr>
<tr>
<td>Martin Central Magnet Middle (MEREDITH)</td>
<td>16.6%</td>
<td>36.3%</td>
</tr>
<tr>
<td>James Monroe High School (MITCHELL)</td>
<td>33.3%</td>
<td>54.6%</td>
</tr>
<tr>
<td>Lakeside Alternative School (NICOLE)</td>
<td>35.3%</td>
<td>86.2%</td>
</tr>
</tbody>
</table>
Data Collection

Interviews

Non-structured or semi-structured interview studies utilize an inductive method to viewing the data; therefore, there is not an established framework for how that data will be analyzed (Thomas, 2003). The use of semi-structured questioning is important for the gathering of rich phenomenological descriptions with which conclusions are drawn, as opposed to more structured, rigid interview techniques which are appropriate when investigating a priori hypotheses (DiCicco-Bloom & Crabtree, 2006). In total, participants answered 22 semi-structured questions over the course of two to three interviews (DiCicco-Bloom & Crabtree, 2006). Examples of the interview questions and their relevance in this study are found in the Table 3.3, and a full list of questions is available in Appendix C.

To arrange interviews, I first gained district and/or principal permission to contact teachers regarding the study. Once participating teachers were narrowed to twenty, interviews were scheduled between November 2017 and February 2018. The interviews took place during non-school hours in a location of the participant’s choosing, often in their classrooms after school hours. Participants’ interviews were conducted through various platforms, primarily in person, but also via video chat programs (Google Hangouts and Skype), as well as by phone. The interviews provided robust data, with many personal and professional narratives through which I was able to analyze results.

Card Sort

In addition to the interview questions, participants were asked to rank retention criteria in a card sort activity. Card sorts are beneficial during interviews, particularly when participants discuss their card sort selections while completing the task (Friedrichsen &
Dana, 2003). The participants were asked to rank ten factors which could influence their retention decisions:

- Monetary Compensation
- Benefits (health, retirement, etc.)
- Usefulness of College Degree
- Building Relationships with Students
- Support from Administration
- Support from Family/Friends
- Opportunities for Advancement
- Recognition in School/Community
- Building Relationships with Fellow Staff Members

The card sort data was analyzed in conjunction with each participant’s response to interview questions. While not the primary data source, the sorts were used to verify teacher responses and as a tool for clarification of codes. During the card sort activity, participants were asked to discuss those items which were most important to them. When discussing issues such as relationships with students, colleagues, and administration, teachers had more detailed narratives than when asked about items such as college degree usefulness or opportunities for advancement.
Table 3.4.

Examples of Interview Questions

<table>
<thead>
<tr>
<th>Research Question #1: What are the teacher identity characteristics of mid and late career teachers which may influence their decision to remain in the profession?</th>
<th>Information Needed</th>
<th>Major Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How does the participant view their role as a teacher?</td>
<td>• Describe who you think you are.</td>
<td></td>
</tr>
<tr>
<td>• How does the participant view themselves as a person?</td>
<td>• How has your race/gender/other important identifier shaped your perception of yourself as a teacher?</td>
<td></td>
</tr>
<tr>
<td>• How does the participant feel the views of others compare to the views they have of themselves?</td>
<td>• How do your professional experiences influence personal decisions?</td>
<td></td>
</tr>
<tr>
<td>• How has the teachers’ self-perception influenced their retention decisions?</td>
<td>• How were you influenced to enter the teaching profession?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question #2: How do professional development programs impact the identities of North Carolina science teachers and their decisions to remain in the classroom?</th>
<th>Information Needed</th>
<th>Major Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• With what type of professional development experiences is the participant familiar?</td>
<td>• Many teachers leave the profession, especially in the first five years. You have been teaching for ____ years. Why have you stayed?</td>
<td></td>
</tr>
<tr>
<td>• How has professional development shaped the teachers’ perception of themselves or their roles?</td>
<td>• Has involvement with professional development programs shaped you as a teacher? How?</td>
<td></td>
</tr>
<tr>
<td>• In what ways has professional development encouraged teachers to remain in the classroom?</td>
<td>• What specific programs would you like to see implemented in your district? Do you feel these programs would help you?</td>
<td></td>
</tr>
<tr>
<td>• How can professional development better meet the needs of teachers?</td>
<td>• What should be done at the school/district level to encourage science teachers to remain in the profession?</td>
<td></td>
</tr>
</tbody>
</table>
Data Analysis

Narrative interviews are often not structured to answer specific questions; rather, they provide insight into the experiences of the interviewee in a social context (Muylaert et al., 2014). Under this particular interview model, the constant comparative method was utilized to sort and analyze data. Using this model, each interview was transcribed by the researcher and the information provided was continually analyzed for patterns to create a hypothesis or theory (Tochim, 2006).

First, all interview data was transcribed and reviewed. Field notes were taken throughout the interviews, and additional notes were made after reviewing the interview files. To begin the coding process, I utilized an open coding method, through which I reviewed participant responses to every question and identified seemingly important statements to guide the development of the codes. For instance, the term “confidence” recurred often when discussing relationships with administration, mentorship, and professional growth. Each of the codes noted was then categorized based on themes that fit the research questions. Some commonly-occurring codes, such as the role of parenthood in retention decisions, are of critical importance to retention studies, yet they did not fit the research questions and were, therefore, dismissed for use in this study. The data points dismissed for this study may be used in future research.

While in the early stages of the coding process, an external coder also reviewed the data for interrater reliability and to ensure trustworthiness of the study. This external coder is a doctoral candidate who has experience in both qualitative and quantitative data analysis. She was provided with ten percent (4) of the hour-long interviews, transcripts, and a blank code book which allowed her to use pre-established (open) codes, as well as suggest others
which she thought might be beneficial in explaining the data. The co-coder and I reviewed
the data separately before coming together to review our analysis. After her analysis of the
four interviews was complete, we compared and modified (through combining or
eliminating) codes to ensure a minimum of 90% agreement among the codes used. Those
codes which were disagreed upon were discussed to ensure they were classified in a manner
which best represented the data, and data points which were not to be used were dismissed.
Once the codes were established and agreed upon, the remainder of the interviews were
completed. After initial coding was complete, I grouped similar open codes together through
axial and selective coding methods to develop themes for each research question, which were
then organized in a final code book (Appendix D). The recurring themes for both research
questions focus heavily around the development of relationships; however, both questions
offer different insights into how relationships influence teacher identity and retention, so
different codes were utilized. A sample of the codebook can be found in Table 3.5.

While commonly used in grounded studies, this constant comparative method for data
collection is useful in interview studies as well. In this instance, it is valuable to employ a
constant comparative method for data analysis due to the nature of narrative interviews: the
participants tell their story; it is not told by the researcher. Therefore, no assumptions can or
should be made; rather, patterns regarding phenomena will be discovered (Muylaert et al.,
2014). The emergence of these patterns aided in the development of theories regarding the
research questions and how they relate to the overarching concern of science teacher
retention through the lens of professional identity.

To best analyze the data provided in each narrative interview, the interviews were
transcribed and analyzed using theoretical sampling. Theoretical sampling is necessary in this
Table 3.5.

*Sample of Codebook*

<table>
<thead>
<tr>
<th>Code</th>
<th>Key Terms</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relationships: Students</strong></td>
<td>Care, Trust, Respect, Children, Bond, Culture</td>
<td>The participant discusses their interactions with students and how it informs their daily practice, classroom culture, or reasons for teaching.</td>
<td>“When you tell them you care about them, and they know you care about them, they’ll do whatever you want. The majority of them. They’ll do anything I ask because I care. Relationships are one of the most important parts of being a teacher. More than how you teach it.” – Jon, Interview #1</td>
</tr>
<tr>
<td><strong>Relationships: Faculty, Staff, Admin</strong></td>
<td>Love, Trust, Family, Support, Guidance, Support, Confidence</td>
<td>The participant discusses how relationships with colleagues, administrators, and other faculty/staff impact their sense of belonging, effectiveness, and role within the school community.</td>
<td>“My first team of teachers was absolutely amazing. I wasn’t expecting the support I got at the school where I worked. We were there for each other, to support each other. Like they’re my family.” – Danielle, Interview #1</td>
</tr>
<tr>
<td><strong>Monetary Compensation &amp; Benefits</strong></td>
<td>Pay Scale, Raise, National Boards, Benefits, Retirement</td>
<td>The participant (directly/indirectly) discusses teacher pay, district stipends, and methods through which to receive raises (such as continuing education and professional development).</td>
<td>“I wanted to serve my home district, but when you consider raising a family and all of that, income becomes a factor. It’s hard to turn down an extra $1,000 a month. That’s substantial.” – Adam, Interview #1</td>
</tr>
</tbody>
</table>
inductive research study as there is not a preconceived theoretical framework (or a priori coding) under which to code participant responses. Instead, participant responses were analyzed for recurring themes. Ten percent of the interview files were reviewed for interrater reliability by an external researcher familiar with the topic. The use of multiple interviews and accuracy checking by participants eased data triangulation and supported the credibility of the study (Yin, 1994). After data collection and analysis was completed, the recurring themes were grouped based on their relevance to the research questions, which are described in detail in Chapter IV.

From the emergent themes came an unforeseen occurrence in that the theme of Critical Incidents arose. Many of the experiences discussed by the interviewees lead to one or two distinguishable narratives which described their teaching experience and fostered their professional identity development. For this reason, critical incidents are included in the analysis of this data, in order to inform Research Question #1 through a narrative lens. The incidents of each participant were reviewed and categorized based on their relatedness to the emergent themes. Three of the critical incidents were selected to demonstrate challenges teachers face within their career, and how those challenges shaped the teachers self-perception.

**Trustworthiness of the Study**

In any study, researcher bias and trustworthiness must be indicated to ensure the study is fair and results are reliable (Shenton, 2004). For both participants and the researcher, there are no personal or professional benefits in any individual’s participation. However, two of the participants in this study are former colleagues of mine, and therefore their data was given to an external coder to be examined in addition to my own analysis, as not to show bias
or skew their story. These participants were included in the study because, despite our having worked together at different points in our careers, their perceptions of reality and teacher identity are personally-held beliefs which I could not have understood entirely without the interview process. In that case, both of my former colleagues were interviewed through the same methods as the other participants, making the process unbiased.

Two criteria were considered when determining trustworthiness of this study: credibility and transferability. First, I ensured credibility of my study by asking the question, “Can I guarantee my findings are accurate?” In order to justify my findings, I first used an external coder to confirm interrater reliability. This process confirms that coding is not biased and reflects what the participants were saying. Additionally, this process was helpful in identifying codes which may have otherwise been overlooked by one researcher. Additionally, the use of direct quotes when discussing the narrative of an individual assisted in guaranteeing their story was being told and that researcher bias did not play a role in interpretation.

Second, I reviewed the transferability of my study. Although this study focuses on science educators, the interview questions could be used to re-create a similar study for teachers of all content areas. The study could be easily re-created using the same interview questions as well as similar methods of data collection. It is my belief that in recreating this study with participants outside of those selected, the same or similar themes would emerge.

Summary

In this chapter, I have provided an overview of the methodology used to design this research study. A basic interview study with narrative and phenomenological mechanisms best informed my study on teacher identity and retention. Utilizing an interview study allows
for multiple data source points, in-depth data collection and analysis, and is easily verified for trustworthiness. In the next chapter, I present the findings from the data collected to answer each of the research questions.
CHAPTER IV: FINDINGS

In this chapter, I discuss findings related to science teacher identity of mid- and late-career science teachers as it applies to their decisions to remain in the classroom. Participants were asked to take part in semi-structured, one-on-one interviews to discuss their experiences as science teachers, reflecting on how those experiences helped to shape their perception of themselves as teachers as well as their desire to remain in the teaching profession.

This study was informed by the following research questions: (1) What are the characteristics of teacher identity of mid- and late-career teachers which might influence a decision to remain in the profession? (2) How do systemic programs, such as the North Carolina Beginning Teacher Support Program and the National Board Teacher Certification, affect NC public science educators’ identity, as well as their desire to remain in the classroom?

Pseudonyms are used for both participants and schools throughout this chapter. Findings are discussed in two sections based on assertions derived by the research questions. First, I present the similarities and differences in teachers of varying career status through the theme of relationships, as relationships emerged as the single most important variable in identity development among participants. Next, I discuss how professional development could improve science teacher identity by creating experiences which build relationships and trust within the school community.

Teacher Identity Characteristics of Mid- and Late-Career Science Teachers

Perception and internalization of specific experiences can create different opportunities for teacher identity development. While two teachers in the same environment may have the same experience, the ways that experience influences the lens through which
they view themselves is dependent on their individual identity views. According to Gee (2000), the broad spectrum on which identity develops is dependent on four major tenants. The Natural Identity (hereon referred to as N-Identity) describes traits which an individual cannot change based on social interaction. For the participants, factors such as race and gender were characteristics which informed their N-Identities and shaped their self-perception. The second identity factor is Institutional Identity (hereon referred to as I-Identity), which describes how identity is formulated through interactions with figures of authority. For the study participants, this includes fellow teachers/colleagues in leadership roles, school and district level administration, policy makers, and members of the community. Discourse Identity (hereon referred to as D-Identity) describes an individual’s evaluation of their roles as it relates to dialogue and interaction with others. D-Identity is greatly impacted by daily interactions, using primarily verbal cues; this interaction may come from friends, family, colleagues, students, or authority figures (informing the I-Identity as well). Lastly, teacher identity is highly informed by the teacher’s Affinity-Identity (hereon referred to as A-Identity). A-Identity is incredibly important to teacher identity as its development is dependent on the inclusion in affinity groups. Affinity groups have similar goals and interests, and its members’ involvement is crucial to the success of the group.

It is important to note the role these identity views play in the development of teacher identity and the role they may play in a teacher’s decision to remain in the profession. Each of Gee’s identity views are dependent on an individual’s internalization of their perceived role based on interactions with others. Analysis of the data from this study revealed the most prevalent theme in participants’ decision to remain in the teaching profession was the
development of relationships. This is not surprising, as the teaching profession is highly dependent on interpersonal interactions.

In response to the card sort activity, 75% of all participants agreed that Relationships with Colleagues or Relationships with Students were among their top three reasons for remaining in the profession. One hundred percent of participants placed these factors among their top five reasons for remaining. While it is clear that the participants in this study value relationships as an important reason for teacher retention, the types of relationships they valued most were markedly different between the participants’ varying years of experience.

**Relationship Needs for Teacher Development**

The types of relationships needed by participants differed based on their number of years and individual experiences in the classroom. Teachers with fewer than 15 years of experience were more likely to discuss relationships with colleagues as being critical in their development as a teacher and their desire to remain in the profession. For teachers in this stage of their career, these relationships were described by the following words: “family,” “support,” “guidance,” and “love.”

During the time of this study, Danielle was an eighth-grade science teacher at Valley Ridge Middle School where she had worked for two years. Prior to coming to Valley Ridge, she worked at another school profiled in this study, Edward Price Middle School. There, she worked for four years as a sixth-grade science teacher. While at Edward Price, she worked on a teaching team where very little teacher turnover occurred. In the following statement, Danielle describes the experiences she shared with her colleagues as ones which shaped her perception of herself as a “good teacher.”
My first team of teachers was absolutely amazing. . . . I didn’t come into this school expecting anything different from a regular school, but I couldn’t believe the support I got at the school where I worked. The women on my team made me feel like I was smart and could be a really good teacher. Like, they listened to me and made me feel like what I had to say was important. They became some of my best friends. Like, I couldn’t imagine going to work without them. . . . And so, with their help on those days when I need to cry or had no idea what I was going to do, those days my colleagues kept me sane. (Danielle, Interview #1)

Danielle’s experience as a new teacher in a highly-supportive environment allowed her to develop close relationships with the team on which she worked. Not only did their interactions support her feelings of confidence in the classroom, but she even felt encouraged to pursue her Master’s degree alongside one of her teammates. She was able to identify herself as a part of this affinity group that added value to the work she was doing in her individual classroom. Additionally, Danielle’s discourse identity was positively influenced by the interactions she had with colleagues from whom she felt empowerment as opposed to being stifled as a beginning teacher.

In the same interview, Danielle noted that she began teaching at a different school two years ago due to her husband’s relocation. She discussed that while the relationships there were not as profound as the ones she developed in the beginning of her career, being close to the staff in her school is still incredibly important: She explained her feelings in Interview #1 saying, “I still don’t know what I’d do without my colleagues. Being on a team is so important to me and it’s like, we have each other’s backs. We make each other better teachers because we know we’re not dealing with things alone.”
For those participants in middle schools, being placed on a team proved to be helpful in guiding development of staff relationships; however, high school teachers also discussed the value of having supportive colleagues of their own. This was particularly true for Haley, who was nervous to pursue National Board Certification after only teaching for four years. She desired a position that would pose greater challenge to her intellectually, but she was intimidated by the idea of undergoing the National Board process alone. She found a community of support within her school which provided the encouragement and intellectual dialogue she felt she was missing elsewhere in her career. Below, Haley explains how the community of support changed her perception of the National Boards process, as well as her consideration of her future in the profession.

*I think I stayed [in the classroom] because I was able to access an intellectual side of teaching with the teachers at my school. During getting my National Boards, I was able to interact and talk about my profession with other teachers, so I felt like I was doing my intellectual work as well as the physical work. They were my community. I knew they were there to give me the encouragement I needed and help me out along the way. I had considered leaving the classroom all together, but I think that the National Boards helped me to see that I was doing meaningful work. And the other teachers at my school who were also doing it made me know it was possible. (Haley, Interview #2)*

This sense of belonging is incredibly important to identity development in mid-career teachers. For those relatively new to the profession, it is important to feel assimilated into the school culture and to feel valued by colleagues. For Haley, the importance of her affinity group in the development of her teacher identity hinged not on a common group of students
or common goals for teaching; rather, her identity development was related to the goal of completing National Board Certification. Joining the group of Nationally Board Certified teachers at her school would provide Haley with the identity-supporting recognition she desired. Unlike Danielle, who was placed on a supportive team by chance, Haley chose to join her affinity group; nonetheless, both women found their identities were fostered through the overall goals of the group. Additionally, both teachers discussed these supportive group affiliations as being a primary factor in their decision to remain in the profession.

Relationships within the school community are also important to late-career teachers, although the distinct difference comes from their outlook on the role of administrative relationships in their own identity development. For those teachers with more experience, holding leadership roles is often more common; this, by nature, means late-career teachers often have a more collegial relationship with their administration.

Adam is a Nationally Board Certified science teacher with an Education Doctorate (Ed.D.) and fifteen years’ experience. He has been recognized as school and district “teacher of the year” and has been the recipient of several regional and state-level awards for outstanding science instruction. Adam is highly involved in professional development and student support for his district, and he believes it is important for teachers to assume leadership roles. In his experience, interaction with and support from his administrators has been imperative to achieving his professional accolades. When discussing his most impactful administrative relationship in his career, Adam discussed one principal in detail as follows.

*I mean, okay. I have been very blessed to work with what I consider to be very strong administrators. The one I worked for the longest time is someone I respect greatly, and I feel as though he wholeheartedly wanted what was best for me. He always*
advocated for his teachers, sometimes to a fault. . . . I have always felt as though administrators have been supportive of me, but the relationship with him was different. I felt like I didn’t have to worry because I trusted that he trusted me. They [administrators] are the face and the voice of the school, and they set the tone with a lot of the perception within the community and within the teachers themselves.

(Adam, Interview #1).

For teachers like Adam, the I-Identity is incredibly important in determining their own understanding of their role in the classroom. I-Identity is shaped by the roles that teachers are assigned by administrators (such as placement on a leadership team or grade-level chair) but is also informed by the teacher’s perception of how they are valued by administration at their school. Adam credits his goal of being the best teacher possible to his desire to maintain a positive reputation in the community among parents and students but notes that administrative support is imperative in giving providing a sense of accomplishment for teachers. Referencing the principal he discussed earlier, Adam explained how their relationships strengthened his self-perception as described in the following quote.

I felt like [principal, name retracted] believed I was a strong teacher. Ya know, the way he interacted with me was not in a way that degraded my own self-concept, rather he found ways to compliment what you did well. I think that would help bolster your sense of self adequacy, your sense of worth as an educator. Your belief that you are making a difference leads to working for the greater good, and all of those feelings. (Adam, Interview #3)
Not all late-career teachers are as fortunate to have the support Adam has from their administrative teams. For some, this relationship can cause pivotal moments in their career trajectory, even as they approach retirement.

Susan, a twenty-three-year veteran teacher, teaches sixth-grade science at a rural middle school with high teacher turnover. She previously worked for an administrator whom she described as “an incredible human being” and worked alongside a team of teachers with whom she got along and felt supported. When her administration abruptly changed four years ago, so did the school climate. Despite the support she still feels from colleagues, Susan is struggling to overcome the desire to search for other career paths. She explains below how daily interactions have not only lead her to doubt the profession, but to doubt her self-worth as a teacher.

*I am in a situation right now where my principal is not supportive. I mean, she treats us like we’re just garbage. But it has made me and my colleagues closer because now we have a common enemy. It’s not us. We have to know it’s not us. That makes my heart hurt for the first-year teacher who is trying to do everything perfect. You know how it is when you’re new and you feel like you’re always under a microscope? She makes us all feel like that. Like, I have no confidence in anything I do anymore. I can’t imagine being a new teacher in this situation and going through this. She would have crushed me. . . . I applied for two jobs today. I am searching for jobs all the time. I love teaching, but they don’t pay me enough to put up with this.* (Susan, Interview #2)

According to study participants, the relationship forged between administrators and faculty can create a welcoming, supportive school environment which empowers teachers to
grow into professional leaders, or it can cause teachers to develop a disconnect between the reasons they chose to enter the profession and why they remain. According to Gee, this Institutional Identity is one that develops around a position which is determined by an authority. In the case of this study’s participants, they have been put in the position of “science teacher” by their school administrators. It is assumed that with that position they are expected to fulfill the duties of teaching science under certain expectations set forth by those authority figures in the school. However, their perception of themselves as teachers develops around their own willingness to fulfill this position. Gee notes that those who are more passively involved with their roles are more likely to see their Institutional Identity as being an imposition, as opposed to a calling. For science teachers, this becomes particularly important when determining whether they should remain in the profession or pursue a career in a scientific field which might fulfill their institutional needs and thus develop their I-identity.

While the relationship needs between mid- and late-career teachers may vary slightly, one relationship theme is clear: both groups of educators rely on relationships with students as the single most important factor in how they view themselves as teachers—and students are their greatest motivation for staying in the profession.

Once more, the cases of Adam and Susan are relevant to understanding this phenomenon. Both teachers felt strongly that their relationships with administrators shaped their self-perception as well as their desire to remain in the teaching profession; however, both teachers noted that their relationships with students had the most profound impact on their satisfaction in the profession.
In the case of Susan, who earlier mentioned feeling defeated by the administration at her school, the strong connection she feels to her students creates conflict with her desire to leave the profession. It is her belief that she is making a difference for her students—not only in their understanding of science content, but in their daily lives. Susan describes the following, rather unusual scenario, as a reminder for why she has remained in the profession for so long.

This year, a student I never even taught came to me and asked for $12 for a field trip because he couldn’t afford it. He didn’t know me, and I didn’t know him. But he knew he could be comfortable enough to ask me for it. Those are my babies. They’re all my babies. It’s all done out of love, because you have to love these kids. Some of them don’t have any other people in their lives that love them. (Susan, Interview #2)

Adam also discussed a connection to the students but was more focused on how the student-teacher-parent triad greatly influences his everyday classroom decisions. He explains in the following statement that parents are often the gatekeepers of the idea “perception is reality.”

At a certain point in my career, I established a pretty good relationship with my students, which turned into good relationships with their parents. Word got out that I was good, that I was a teacher to have. I liked that and I didn’t want to lose it. I tell new teachers, your reputation is all you have, and perception is reality. That is where those things come from to me. If they think I am good, I am good. That becomes my reality. But therein, it also makes me do things that make that reality, real. (Adam, Interview #3)
While their outlook on student-teacher relationships may differ, both Adam and Susan clearly indicate that their pedagogical practice as well as their self-concept are most influenced by their interactions with the children they teach. In response to relationship development with students, middle school teachers tended to show more identity-support when discussing students’ emotional well-being, while high school teachers felt encouraged by student outcome and success.

Sandra teaches eighth grade in a very rural, low-income school. The area in which her school is located has only one gas station and is a minimum of thirty minutes away from any major grocery store. Her students are often from minority backgrounds, and many live in multi-generational households with grandparents, parents, and siblings. Her class sizes are very small, and almost all the students she teaches are native to the area. Sandra does not live in the area, and although she lives in the same county as the school, knew very little about the struggles many of her students faced every day. Below she describes her shock when she learned how many of her students living in a coastal community had never seen the ocean.

There isn’t one thing or one moment that makes me say, “I am going to do this forever.” Its little things. I know our kids at home are not getting everything they need. There is so much need in this area that I would have never known about had I not started teaching here. I mean, it breaks my heart that we study the ocean and there are so many of my kids who cannot relate to that topic—even though our school is less than twenty minutes from the coast. So I like knowing that I can give them experiences they'll never get [at home]. I hope I can encourage them to see beyond this little town and that there is so much more available out there for them. (Sandra, Interview #2)
Lindsey teaches biology at a high-performing, rural school on the edge of a large city. Most of the families in this area commute to the city for work, allowing the students to have access to many resources that rural students typically do not. For this reason, Lindsey does not express the same concerns echoed in Susan and Sandra’s experiences, but does reflect positively on her relationships with students and how that impacts her daily decision making. As she explains below, Lindsey believes the first step in ensuring students feel comfortable in the classroom is to get to know them as individuals.

*I want students to want to be in my class. You know, providing them with a safe space that they can flourish in. They know that I have a personal interest in them. They know that they’re allowed to be funny or sad or happy or serious and that it’s okay. It’s okay to be themselves. I think that starts on day one, just getting to know them.*

*(Lindsey, Interview #2)*

Lindsey’s response to students is similar to other participants; however, when asked to rank where “Relationships with Students” would be in her reasons for remaining in the profession, she listed it as factor seven out of ten, explaining in her second interview, “I think it [Relationships with Students] is important, but I just don’t think it’s one of my strongest assets. I don’t want to be their friend; I just want to be their teacher. But they still need to know you care about them.”

Other participants had a very different view of their role with students. Meredith, who struggled to find her teaching identity after a violent attack by a student in her first year of teaching, believes building foundations of trust with the students is the most critical part of her job. Detailing her desire for students to feel safe in her classroom is not surprising, as she
has been in situations in which she did not feel safe in school. As detailed below, Meredith believes that relationships with her students is the primary reason for teaching.

*The kids, it’s almost the main reason I teach in some ways. My role is to create a safe spot for them. To give them knowledge, of course, but to also be a mom and a nurse and a counselor and a sibling. I sort of act like a big sister. They share things with me. It’s just that they know that they’re telling someone with authority, but they feel safe enough to relay information.* *(Meredith, Interview #1)*

Student-teacher relationships can create deeply personal reasons for a teacher’s decision to remain in the classroom. Additionally, relationship development between a teacher and their colleagues is critical in developing a sense of belonging and can enhance an individual’s Affinity and Institutional identities. According to study participants, relationship development is the most crucial factor in their own self-identity, as well as their reason for remaining in the profession during times of adversity. Rachael, a twenty-five-year veteran science teacher, explained the importance of relationships when asked to reflect on her school environment.

*I feel like at my school we’re like a family. Everyone. The teachers, the administrators, the students, the support staff, like everyone. Just like, we all have disagreements just like you do with family. We air it, we get over it, we move on. But we still love each other. There’s not animosity among people. Everyone is there to help out. I didn’t always feel this way. At my first school I didn’t feel very supported, but here I know that we’re in this together.* *(Rachael, Interview #1)*
Relationships & Gee: Building Identity Through Dialogue

While they differ in many ways, all of the participants in this study emphasized the need for relationships in their work environment. The nature of teaching requires one-on-one as well as group interaction, and relationship building is a crucial component of positive interactions. Some of the relationships described, such as those with administrators, influence the individual’s institutional identity and how they view their role in the workplace. Others discussed in more detail the affinity identity they felt was fostered in their relationships with colleagues, other educational professionals, and even students. However, all of these relationships were discussed as being dialogical, or based on talking to others. This discursive relationship supports Gee’s theory that identities are established and developed based on individual interactions and conversations with others. With the understanding that relationship development is critical to teacher self-perception and classroom culture, it is imperative that teachers are taught how to involve themselves in effective discourse with all stakeholders in the school.

How Student Achievement Impacts Teacher Identity

Building relationships with students is of high importance to teachers, but those relationships often hinge on the climate of the school regarding student achievement. Student achievement is subjective, with the majority of teachers indicating several ways through which they measure achievement. However, for North Carolina students in grades 3-12, end-of-year summative assessments are required in most subject areas. The stress of testing can impact a teacher’s view of their working conditions; particularly regarding relationships with colleagues, administrators, and students. Susan, who discussed her deep concern for the well-being of her students, was notably upset when discussing the role of testing in her perception
of her ability and desire to teach. She explained, as follows, her belief that assessment focused environments create paranoia and worry undue to teachers.

*When testing became a major factor in our school system. One of the things that made me first want to leave was the competitiveness of “these are your students, these are your test scores, and it gets attached to your name.” ... I remember being on my knees in the hallway crying over test scores. It made us all more paranoid. People were worried about losing their jobs. Worried about what people would think of them. (Susan, Interview #2)*

Later, Susan further explained the impact of high-stakes testing on what she teaches her students: “I want them to know so much more than what is on some test. That’s not how to measure learning. They need to learn by doing. They need to pull tadpoles out of the pond and watch them turn into frogs. Testing is killing me. Comparing children and teachers is killing me. It’s breaking my spirit. It makes me feel like I am setting them up for an unreal understanding of what it means to be successful.” For those teachers in high-stakes tested subject areas, such as eighth-grade science, biology, and AP courses, the pressure for students to perform on tests often threatens teacher autonomy and provides an explicit understating that teacher success correlates specifically to student performance. As a biology teacher, Lindsey, who did not feel she was always successful at developing relationships with her students, discussed testing as a tool she could use to measure her success in the classroom. As she explains in the following statement, Lindsey’s school environment focuses heavily on testing, and therefore is important to her overall classroom objectives.

*“Growth is really important to my administration and so therefore it’s really important to me. I think that’s what really matters when it comes to student...*
achievement. Not how much they know, but how much they’ve grown at the end of the semester.” (Lindsey, Interview #2)

In North Carolina, each school’s yearly performance is published online in a database referred to as the North Carolina School Report Card. Table 4.1 shows the 2016-2017 North Carolina School Report Card overall grade for three participants who are in schools with high, medium, and low science proficiency, along with their opinion on student achievement as it relates to their effectiveness and/or desire to remain in the classroom.

Dylan is a middle school teacher in a suburban community just outside of a small metropolitan area. The school has a very low percentage of students on free and reduced lunch in comparison with the rest of the school district and has low numbers of students and teachers of color. He describes his administrators as being of high quality, particularly his principal, with whom he transferred from another school to his current role at Ocean View Middle. Student success is the top priority in his school, and teachers are expected to have positive impacts on student achievement. This is reflected in his views on achievement and how it influences his desire to be in the classroom.

Mitchell, who is a nineteen-year veteran biology teacher in a rural high school, has a slightly different viewpoint on the role assessment plays in his teaching practice. As a biology teacher, his assessment of students is state-mandated; however, he views his role as more than just a teacher of content. He feels it is his duty to teach children to desire learning—to understand how the world works around them in both biological and social contexts. His school’s average science assessments are mid-range, and his principal places a higher emphasis on student growth than student achievement. James Monroe High School has not been a historically high performing school; however, according to Mitchell, things
Table 4.1.

Examples of Student Achievement in Relation to School Science Proficiency

<table>
<thead>
<tr>
<th>School Name</th>
<th>Participant(s)</th>
<th>NC School Report Card Overall Grade</th>
<th>Science Proficiency Percentage</th>
<th>Statement on Student Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean View Middle School</td>
<td>Dylan</td>
<td>B</td>
<td>88.7%</td>
<td>“The reason for teaching is to watch students achieve something. If you don’t want to see them succeed, you don’t need to be a teacher.”</td>
</tr>
<tr>
<td>James Monroe High School</td>
<td>Mitchell</td>
<td>B</td>
<td>65.9%</td>
<td>“Teaching is a lot more than content to me. Teaching is helping them become viable members of a community. Teaching them how to socialize, how to understand content, how to understand the world around them: politics and voting and what have you. I always tell my students, “If you don’t know something, people can trick you.”</td>
</tr>
<tr>
<td>Sunnyvale High School</td>
<td>Haley</td>
<td>C</td>
<td>34.9%</td>
<td>“I know I help them to be good students, but someone else could probably do a better job at making them learn the content. I don’t know, I guess I just think relationships are what makes the difference and I don’t really focus on the test scores.”</td>
</tr>
</tbody>
</table>
have improved greatly since their new principal took over in 2015. He now describes the environment as one that supports “students as people, not just students.”

Haley’s experience in a low-performing urban school is much different than that of Dylan or Mitchell. Haley does not view testing as an important part of her pedagogy, noting that she believes relationship development is more valuable to her students’ success than standardized scores. Many of Haley’s students are from low-income minority communities, some of whom would be first generation high school graduates upon leaving Sunnyvale High. For Haley, the content cannot be delivered without establishing trust with the students. For that reason, she notes that she may not be the strongest deliverer of content knowledge to students, but she still feels she is an effective classroom teacher.

In North Carolina schools, teachers are faced with mounting pressure from local and state officials to produce high performing scores on standardized assessments. This is due, in part, to the implementation of the Educator Effectiveness Model, through which various determine teacher and school effectiveness. Part of the effectiveness rating teachers and schools must consider is EVAAS data. EVAAS (Education Value-Added Assessment System) data measures school and educator effectiveness through the results of end-of-grade (EOG) or end-of-course (EOC) scores. Teachers are assigned a numeric and color coded effectiveness rating at the end of each school year. Teachers who are in the “blue” category are exceeding expectations. A “green” rating indicates teachers have met expectations for the school year; while “red” indicates that teachers have not been effective in their classroom.

Conflict occurs within those schools with average (green) performance wherein the teachers feel pressured to deliver higher test scores. Graham, who is a Nationally Board Certified teacher with a Master’s in Science Education, discussed feelings of “average”
effectiveness due to test scores. His reflection on student relationships indicate that his students view him as a more effective teacher than he views himself because the students’ achievement tests are lower than he would like. For teachers in this situation, identity can be greatly impacted if they do not feel their measure of student success is being met. In addition, the administrative pressure to increase student performance can impact a teacher’s desire to remain in the profession, particularly for teachers such as John and Valarie, who view testing as a less critical component of their job requirements.

**Standardized Performance & Gee: Institutional Values**

The teachers in this study were often concerned about the perception of their abilities in the eyes of administrators, parents, students, and the community. Unlike the other three forms of identity described by Gee, Institutional Identity is internalized based on perception of perception. For instance, those teachers who worried their administration did not like them were more likely to reflect negatively when asked about their leadership abilities than those who had positive relationships with supervisors. This self-perception of how others perceive one’s ability or role is how Institutional Identity development begins. For many of the participants in this study, student performance on standardized tests indicated to them how their administration would perceive their teaching ability. This puts pressure not only on the teacher to provide effective instruction, but places their perceived identity into the hands of the students who are taking the test. The stress of being a low performing student then is transferred onto the teacher, then to administration, and so forth. Therefore, it is valuable to look at the emphasis placed on testing and how the teachers view their own abilities; understanding that much of their negative self-concept could be linked to their student testing abilities.
Conflicting Perceptions and Critical Incidents

Critical incidents, as defined by Shapira-Lishchinsky (2011) are “usually an undesirable situation that has been experienced by an employee” (p. 650). These events provide a marked shift in a person’s perception of their situation. For science teachers, critical incidents often occur due to conflict between their internal perception of their role and the perception of others both in and outside of education.

Recently, the state of North Carolina made controversial changes to the teacher pay scale. In 2013, those teachers who had not yet received an advanced degree would no longer be eligible for advanced licensure pay. In addition, teachers were also no longer eligible for longevity pay and all teaching contracts moved to a year-by-year renewal. The Teacher Accountability Model of testing was also instated to measure teacher effectiveness by student growth on summative state testing. These policy changes not only impacted how teachers were paid, but also encouraged competition and increased tension within the schools.

This example of a critical incident in education impacted the self-perception of science teachers within this study, many of whom referred to a *de-professionalization* of teaching. Teachers of all experience levels struggle with the identity of being “just a teacher,” when comparable professions are held in higher regard by policymakers as well as the community. Susan described a critical incident which changed how she saw her value in the community. Susan has a bachelor level license in North Carolina and does not have a desire to attend graduate school or pursue National Board Certification. She never felt as though her qualifications would hold her back from taking care of her family and doing her job. However, after more than two decades in the classroom, she noticed local supplements were becoming less and less—and her family’s financial security was being impacted. Susan
attended a Board of Education meeting for her district where the topic of teacher pay came up. She was appalled to hear a Board of Education member (whose daughter was in Susan’s class) state that teachers didn’t need a pay raise, they just needed to be given a cookie. As follows, Susan describes her disdain for such a statement, and how that impacted her self-esteem.

One of the Board of Education members said, “Teachers don’t need a pay raise. They need to feel comfortable. Sometimes a cookie would make them feel appreciated.” But the thing is, we don’t feel appreciated. I feel taken advantage of. I don’t feel like these people see me or any other teacher as a real professional . . . . We’re factory level. We’ve been taken from the place of esteem in an environment where you wanted to please the teacher. Now I feel like I clock in and I clock out. We are underpaid babysitters. (Susan, Interview #2)

Adam echoed these frustrations regarding teacher pay as an indicator of professionalism. After completing his doctorate, he was disappointed to learn he would not be paid on the doctoral scale if he remained in North Carolina. He described feeling as though policymakers were not concerned with the professionals within the school and were therefore creating a risk of losing qualified teachers to other states. Adam did leave North Carolina for one year before assuming the position at his new school, and only returned when his oldest daughter was diagnosed with a lifelong illness which needed constant attention. He explains in the narrative below his internal conflict with returning to his district while knowing he would lose a substantial part of his salary.

I had finished my doctorate, and there was some question about whether North Carolina was going to pay [teachers] on the doctoral scale. The bordering county
very close to us is in a different state, and their pay scale was considerably higher. When I jumped to that district, my salary increased close to $13,000 per year. My decision to return [to North Carolina] was multi-layered but hinged on my daughter’s diagnosis and needing to be closer to her while she was in school. I was happy to come back because this is my home. This is where I grew up. I wanted to serve my home district, but when you consider raising a family and all of that, income becomes a factor. It’s hard to turn down an extra $1,000 a month. That’s substantial. (Adam, Interview #1)

Teacher pay is not the only indication of public perception of teachers. Graham explained how that feeling of powerlessness is present, even when trying to advocate for what is best for his students. While an advocate for change in outdated policy, Graham explains in the quote below that lack of free time makes that a challenge.

I’d love to figure out a way to advocate more for changes that need to happen at the state level. I mean, there’s so many things that need to be changed. But I can’t have a full-time job as a policy maker because I love being in the classroom. For instance, I would love to see the state actually focus on the ‘Career’ part of ‘Career and College Ready,’ because they’re pushing every single kid to become prepared for a four-year degree. It turns them off from school and makes it look like we’re not doing our jobs when they aren’t successful in these courses. (Graham, Interview #2)

While the effects of these critical incidents are shared among many of the teachers within this study, some critical incidents are more powerful in changing a teacher’s identity and determining their desire to remain in the profession. For three of the teacher participants in
this study, these critical incidents forever shaped their perception of themselves as science educators.

**Critical Incident #1: Experiencing Racism as a Beginning Teacher**

Danielle describes herself as someone who was “born to teach.” She tells the story of knowing that she was a teacher when she was a young girl and would teach her stuffed animals for fun. In telling her story, Danielle describes her struggle to officially decide to enter the teaching profession in high school because she was concerned about the income. But one guidance counselor, as she details in the following narrative, made her remember her true passions.

*I knew I was a teacher. My whole life, like, as long as I can remember it’s all I ever wanted to do. I would teach my stuffed animals, write on my mirror with the Vis-A-Vis markers like it was my chalkboard. At the end of the year if my teachers got a new text book, I would ask them for their old teacher manuals so I could go home and play with them. I was always supposed to be a teacher. That was, until high school when I thought I’d do something else because I wanted to go make some money. But my guidance counselor, who I never told I wanted to be a teacher, told me about the teaching fellows scholarship and really encouraged me to apply. I remembered all of this that I wanted to do my whole life, and I thought, “If I got the scholarship, that’s what I am going to do.” And here I am. (Danielle, Interview #1)*

Entering the teaching profession, however, proved to be different than Danielle expected. While she found a strong community of support from her colleagues and administration, Danielle found herself at odds with a group of parents over something in her classroom she could not change—her race. One parent, whose son was in Danielle’s science class, was
continually critical of Danielle’s teaching style, classroom management, and even content delivery. This issue was beginning to damage her self-esteem; and, as she reflects below, became a trial through which she had to learn how to approach this sensitive issue.

She would drag my name through the mud. Then suddenly his friends also started acting up. And then I was having trouble with a lot of the parents from this little group. One of my teammates overheard the boys calling me the ‘N’ word. I was devastated, because I knew that this was personal. This didn’t have anything to do with me as a teacher. But it still sticks with you. At first, that next day when I came back to school when I saw him I was so angry and I could feel myself getting warm on the inside because I was so mad. But now I try not to take it out on the child, because I feel sorry for them. But I had this team who supported me, and together we defeated her [the student’s mother]. Our team was doing so well, it allowed me to not stick out like a sore thumb. You’re not going to make me upset. You’re not going to make me cry. If I cry, I am going to cry later. (Danielle, Interview #1)

Danielle’s experience as a first-year teacher who felt personally attacked has changed how she views her role as an African American woman in the classroom today. She describes her race as being a factor which she cannot overlook in her teaching practice, but also a tool through which she can empower herself and others, in the following statement.

I just felt like that is something I can’t change. I can be a better teacher, I can communicate better. But I can’t change being black. And I can’t make people see past that if they don’t choose to. I felt like I didn’t have a way out there. I don’t live in an all-black society or community, so that made me question if I could really do this? Could I really work in a place where people judge me based on the color of my skin?
And then I realized that that is going to happen no matter what job I have. But I am here for the kids, and that’s what matters. Not just my African American students, either, but all my kids. (Danielle, Interview #1)

Ultimately, Danielle’s negative critical incident of experiencing racism in the classroom resulted in a more positive, self-assured approach to teaching. The situation, while difficult in its time, taught Danielle how to build relationships with her colleagues, to advocate for herself as a teacher, and to navigate relationships with students who were different from herself.

Critical Incident #2: Experiencing Racism as a Veteran Teacher

Like Danielle, Nicole is an African American female who has experienced racism in her classroom. Unlike Danielle, Nicole did not have these experiences until later in her teaching career. Nicole transferred to the alternative school where she currently teaches in 2010. Prior to that, she taught in a large city borough in a school which primarily served minority (African American and Latino) students. She was happy in her role as a science teacher, but after getting married, she decided to join her husband in North Carolina. She refers to her unique transition the following narrative.

I think that when I was in in the city—so I was in a totally different, like the opposite demographic of everything. When I was a new teacher, all of my colleagues were also minorities. There were very few Caucasian teachers. And all the kids were minorities. I never taught a Caucasian student, ever. Until I moved here. And I was actually concerned because I was like, I didn’t know if I would be relatable to them. I was concerned about that. And when I first started the climate of this school was different. Not better not worse just different. Like the kids were just different. One of
the kids were like, “So you’re a Yankee? You guys come here and steal all our jobs.”

And I was like, “Whose job did I steal? It was posted. I promise you nobody is beating down the door for teaching these days.” (Nicole, Interview #1)

When she began working at the alternative high school, Nicole anticipated facing different challenges from her students. One of the challenges she did not anticipate, however, was the level of blatant racism she would face. Nicole’s school is located in a very rural, former farming community. Many of the students who attend the alternative high school have been removed from their assigned high school due to disciplinary issues. Nicole describes her relationship with students as being difficult to foster but important once they are developed.

The most recent school year, she explains below, presented her with new obstacles in the development of student relationships.

This has been my most challenging year of all of my years. And it’s weird because most of the kids are pretty easy going. There is just like a handful, less than a handful. I’ve dealt with like racism for the first time. But I’m able to understand that I am dealing with children. At first it made me want to be really angry but I was like no that is not the right approach. (Nicole, Interview #1)

Nicole knew she needed to address the issues in her classroom. Even though the racist comments were directed at Nicole, she did not believe that retaliation or resentment towards students was the right way to handle situations of racism.

So I just use it as a platform to get all their misconceptions out of the way. . . . So, I just use it as a way to educate them and although I don’t really think it changes them but at least they know. Even if they are still going to feel the way they feel, again I have to remember that these are children. They are not just pulling this out of the
sky. This is what is happening at home. I have no control over this. (Nicole, Interview #1)

Regarding the student mentioned above, Nicole added that small victories get her through the tough days.

So. I had a breakthrough with the racist kid today. He had gotten in trouble for something that happened in the bathroom and he came to class really late. The kids were working, and I was playing music in the background and when he came in I was playing country music and one of the songs I knew. And he was like, “You know this?” And I was like “Yeah, that’s my jam!” So, I could see him thinking, like, “Hmm she’s not so bad.” I don’t know how much of a breakthrough it is but baby steps. (Nicole, Interview #1)

In contrast to Danielle’s story, Nicole had several years of experience in the classroom prior to experiencing her critical incident. While Danielle relied more heavily on her colleagues for support, Nicole used her experiences to navigate through her critical incident. Relationships with students, even during critical incidents, can shape how a teacher perceives their role in the classroom and can shape how they respond to ethical dilemmas.

Critical Incident #3: Violence in School

Meredith has been teaching science in North Carolina for six years. To see her today, Meredith is a confident, happy, and energetic teacher who loves her job. However, she spent her first two years in an inner-city school in a major metropolitan area. Coming to the United States on a work visa, Meredith was required to maintain a teaching job or risk deportation, so she took the first job she could find. She did not feel connected to the school at which she was hired, but she knew she must remain in her position. She did not have a formal mentor
and did not get support from her administration when she needed it most. She details below a description of her former students and how they changed her in the first few years of teaching.

The kids I taught were not just ‘tough.’ They were dangerous. There were guns in my classroom on a regular basis. Students had drugs at the school. People got stabbed a lot. I had my shoulder separated twice. I got punched in the face during summer school by a thirteen-year-old who said she just lost control and didn’t remember anything. That changed everything for me. I wasn’t the same person after that. My trust in humanity was really altered at that point. (Meredith, Interview #1)

But job dissatisfaction turned to a critical incident one day after school, when a male student attempted to force himself upon her. Meredith’s description of her attack varies between usage of the word ‘assault’ and ‘harassment.’ Details of her attack will not be included in this narrative, however it is important to note that the events which she describes are perceived by the researcher as assault. Meredith recalls this life-altering occurrence in the narrative below.

I was sexually harassed by one of my students. When I told my principal about it, he was like “What do you want me to do about it? If we take him out of your class, he’ll probably drop out. We need to get our graduation numbers up.” I hated the job. I hated it. But you have to understand another part of this, I was on an H1B Visa at that point, meaning I could only be hired for my degree, which means I could only be a teacher. At that point in our state, it was the only place I could get a job. So it was move back to Canada or keep this job and hope it would get better. Life sucked. I put on forty-five pounds, mostly from the sexual assault—um, well, harassment. I changed
everything about how I looked. I thought, “If I could be uglier, maybe they’ll leave me alone.” I shut down for my own safety.

While telling her story, she appears to withdraw from the conversation. According to the researcher field notes, her demeanor shifts and Meredith begins speaking more rapidly and with a sense of urgency to end the conversation. Noticing this, I asked her about leaving the school. Below, she describes how that process was even a challenge to her already low self-esteem as a teacher.

_I was also the last teacher hired in the science department. Since I was the last one and kept saying things like, “This is wrong,” I actually got fired. They said I wasn’t a good fit for the school, which was accurate because I liked being alive. They told me I could resign or would be fired and not be able to teach in the state anymore. So, basically, I was bullied and harassed the whole way through with no support from anyone. I never thought I would say this but thank God for North Carolina. Even if the schools are a mess, whenever I want to complain I am like, “At least here I haven’t been punched yet.” (Meredith, Interview #1)_

Meredith’s experience is, fortunately, not common among the participants in this study. However, violence in schools is not unusual. For those teachers who experience extreme critical incidents such as these, changes in teacher identity are inevitable. Experiencing sexual or physical violence while on the job can make the decision to remain in the career nearly impossible. For Meredith, facing the choice between deportation or leaving an unhealthy work environment caused physical and emotional distress. Fortunately, her relocation to North Carolina allowed her to start a new chapter in life; unfortunately, her experiences greatly dictated the types of schools to which she would apply. School reputation
and safety became her top priority in searching for a new job. In her first interview, Meredith explained, “I think everyone should have the experiences I had, just maybe not to that extreme. All teachers should have experiences that knock them down. . . . My current school is my prize for getting through the [expletive].” Meredith’s experiences also greatly impacted how she views the roles of relationships in schools. While she tries to bond with her students, she discusses needing support from other teachers much less often than other participants. This is due, in part, to the minimal support Meredith was given as a beginning teacher during very difficult critical incidents, as follows.

*I never had a real mentor, but it was fine. It was kind of sink or swim thing for me in the beginning, but that was okay. It works because I can work on the fly. I don’t have a problem with that, but it was hard. It’s so hard to be a first-year teacher. You need to know you’re not going to get fired in your first few years, especially when you’re learning. . . . If there was more availability to make mistakes, it would be a starting point to help [new teachers] relax. And you need actual mentorship support where you actually have someone watching you—not like the [North Carolina] Beginning Teacher Program, just someone who can hang out with you anytime at any point of the day. Someone specifically to work with beginning teachers. (Meredith, Interview #2)*

Critical incidents, regardless of how extreme, have lasting impacts on teacher identity development and can, in some circumstances, determine how a teacher feels about remaining in the profession. In the cases of the three critical incidents examined in this chapter, N-Identity plays a large role in determining how teacher identity is impacted. For Danielle and Nichole, racism in the classroom directly impacted how they viewed their role as teachers
and impacted how they felt they must navigate the school environment. For Meredith, the act of sexual violence against her as a young woman shaped how she viewed the teaching profession and profoundly impacted the types of schools in which she would agree to teach in the future.

The negative effects of critical incidents are often lessened through relationships, as demonstrated through the three critical incidents described in this chapter. In the case of Danielle, building relationships with faculty improved her ability to handle stressful, racially-charged situations in her classroom. Nicole was able to combat racism by using her experience to strengthen relationships with her students. Lastly, Meredith’s experience jaded her opinion of the profession as a whole, due, in part, to the lack of supportive relationships developed during her critical incident. She was, however, able to use the experiences to build new, trusting relationships with her students once she was outside of a dangerous situation.

**Critical Incidents & Gee: Identities in Conflict**

Critical incidents commonly occur during undesirable experiences which shake an individual’s self-concept. While these conflicts can occur in any one of Gee’s four identity viewpoints, the conflicts which seem to have had a lasting impact on the participants in this study have been those surrounding Natural Identity (N-Identity), particularly race and gender. Natural Identity plays a unique role in development of teacher identity, as it can be both a positive and negative aspect of a teacher’s identity when critical incidents occur. Race, for instance, was not brought up in any of the critical incidents described by non-minority participants. For minority participants, however, race was discussed as both a positive and negative aspect of their teacher identity; often in regard to how others have perceived their
race as an indicator of their abilities—closely linking this deeply personal identity to those which involve interactions with others.

**Professional Development on Teacher Identity and Retention**

Professional development, according to Jana Hunzicker (2011), should be aligned with teachers’ needs both professionally and personally. In her study, teachers were asked to discuss their experiences with mandatory professional development, such as the North Carolina Beginning Teacher Support Program, school/district mandated professional development, and state programs. In addition, they discussed their experiences with optional professional development opportunities, including National Board Teacher Certification, professional development conferences/institutes, and online learning communities. Analysis of the interview responses showed teachers felt they would benefit most greatly from professional development which fostered relationship development within the teaching community and met needs of the individual school culture. Three assertions can be derived from this data on professional development:

1) Mandated professional development practices are not viewed as beneficial in the development or improvement of teacher identity.

2) National Board Certification does not strengthen teacher identity or desire to remain in the profession by process but does impact teachers by outcome.

3) Mentorship provides great opportunity for all teachers to reflect on their reasons for remaining in the classroom and to develop teacher identities.

North Carolina license renewal occurs in five-year cycles for career status teachers. Within that five-year window, eight continuing education credits (which equates to eighty hours of professional development) are required to maintain licensure. A minimum of thirty
hours must be dedicated to the teacher’s content area. Professional development may be mandated or optional, and can be implemented at the state, district, or school levels.

Mandated professional development for North Carolina teachers includes participation in the North Carolina Beginning Teacher Support Program for all teachers in their first three years. Non-mandated professional development, such as National Board Certification, is very popular in North Carolina. In fact, North Carolina 21,000 Nationally Board Certified teachers—nearly 8,000 more teachers than the next closest state. In this section, mandated as well as optional professional development programs, specifically National Board Certification, are examined, as are the ways these programs help in developing teacher identity.

**Mandated Professional Development, Identity, and Retention**

Over the course of the interviews, participants discussed how professional development impacted their views of themselves as teachers and whether professional development contributed to their decision to remain in the teaching profession. While professional development was indicated as a tool which could strengthen their self-esteem, pedagogical content knowledge, and overall satisfaction in the classroom, most participants felt as though current professional development practices do not achieve these goals. Professional development, in their opinions, was not a resourceful use of time if teachers did not feel they were growing as professionals.

Nicole, who teaches in an alternative school setting, describes locally-mandated professional development as missing the mark when it comes to improving teacher practice. In the following statement from our second interview, Nicole states that professional
development is not effective for her school culture because it is never based around the needs of her student demographic.

My big complaint about PD is that we already know it and we don’t get the next step. I think that would make me a better teacher. They’re like, “here’s the kids you’re working with.” And we’re like, “yeah, now what?” We never get to the ‘now what.’ I don’t want to baby or enable kids who struggle. I have the end result in mind. These kids are going to be adults, and we need to help them now because the real world doesn’t care if you’re not doing your work. I want to learn how to make them learn better. Tell me how to teach them and be more effective. But the PD we have totally misses the mark. (Nichole, Interview #2)

If current mandated professional development practices are not viewed as impactful by teachers, what types of professional development would improve their teacher identity and overall self-confidence in the classroom? According to participants, the answer lies in fostering interaction with other classroom teachers. Both mid- and late-career teachers discussed the vast benefits of opportunities to interact with and learn from other professionals in their content area. The ability to cultivate relationships with other teachers both in and outside of their school was viewed as a valuable, and often overlooked, tool for enhancing professional growth and extending a supportive professional learning network.

Matt advocates for this practice and is hopeful his school will fulfill a promise to make professional development more suited toward the teachers’ need for networking. Matt is a thirteen-year veteran teaching eighth-grade science at a small, rural school. When he began teaching, his school had not implemented Professional Learning Communities (PLCs), and he did not have the opportunity to work with other science teachers on a regular basis. As
a lateral entry teacher, Matt struggled with pedagogy through his first years, particularly regarding classroom management. He found his solution to his classroom management issues was to have a highly teacher-centric classroom, where he provided students with direct instruction and did not allow for research-backed, problem-based learning. He did not feel as though he was as effective as he could have been, despite having a deep understanding of the content he was teaching. Matt explained in his second interview, “I felt like I had a strong background in science, so I don’t think I needed much [professional development] in the way of content. But having a PLC would have helped, because I had a mentor who was nice and kind and helpful, but it was a far cry from what a PLC does.” When asked what types of professional development would now be helpful in supporting his growth as a professional, he excitedly discussed the possibility of engaging with other teaching professionals—even if those teachers were not in his content or grade level—in the following reflection.

*We’ve been talking about doing this in our school this year and I really hope we do it. I just want to watch teachers do what they do. There are so many intangibles you can’t see in the day to day of teaching. Sometimes, like, when you’re trying something new or exciting it’s not something you can put into words for others, but something you can see. Sitting in a seminar isn’t exciting, but I would like a way to watch other people. Even if it were just other teachers at my school. I’d love to see what the great math teachers do to teach math, I don’t even care if it’s science. We never get to just sit back and watch what makes a classroom function. (Matt, Interview #2)*

Matt was not alone in his belief that current professional development practices could be improved by incorporating observations and interactions with other teachers. Haley, who
teaches high school environmental science at a struggling urban school, also discussed her desire to view other teachers in their classrooms as follows.

*I think I would like to be given the chance to go watch other teachers teach and go talk to them about teaching. I went to this speech about pockets of excellence and how if you witness other people’s areas of excellence it is like, “Look at us doing this really great thing.” And then other people begin to think, “Maybe I could do a really great thing, too!” Like, mentors at another school or something. I think that would be really helpful in understanding the great things teachers are doing, but also understanding that you have something to offer to others, too. (Haley, Interview #2)*

Sandra noted below the importance of interacting with other teachers, too, and discussed how this could be done without losing valuable instructional time in the classroom.

*We did this teacher academy this summer in our district, and it was a good opportunity for me to work with other eighth grade teachers because I don’t have access to team planning since I don’t have another eighth grade team at my school. So, like, we don’t have those types of PLC’s and I really liked that opportunity. It helps for all of us to sit down and look at the standards and say, “Here is what worked and here is what didn’t.” Like, talking to other people made me aware that some of these things I struggle with are the things that other people struggle with, too and, um, I’d like the opportunity to do this more often during the school year instead of just over the summer because I really benefitted from seeing their perspective and talking through my own struggles. (Sandra, Interview #2)*

Teachers desire the ability to interact with others and discuss teaching practices for several reasons. Most notably, interacting with others provides a community of support for
teachers who are struggling to teach a specific concept, or for those teachers seeking indication that their practices are positively impacting students. Current professional development practices, according to the data, are not successfully allowing teachers to feel this level of comradery; rather, they are viewed as “hoops [they] have to jump through” (Susan, Interview #2) in order to renew their teaching license.

Teacher identity, according to the data, is not being positively influenced by professional development practices. For those teachers struggling with identity and questioning their own future in education, changes to professional development programs could be highly beneficial in supporting their growth and understanding their needs.

**Professional Development & Gee: Creating Affinity Groups**

While participants in this study could not agree that professional development practices were helpful in supporting their teacher identity, many did discuss the ways that professional development does or could enhance their relationships with others; thus increasing their participation in affinity groups and influencing their Affinity Identities. Affinity Identities may be self-imposed (such as choosing to join a club) or mandated by an authority figure (such as being told to serve on the school leadership team). For teachers, there are many opportunities to belong to several affinity groups at one time, increasing their interactions with others and building a rich Affinity Identity. Professional development practices which emphasize communication and interaction among colleagues, supervisors, and support personnel are desirable as they create greater opportunity for legitimate participation within the affinity group, and discourages passive participation from those less inclined to become involved.
National Board Certification, Teacher Identity, and Retention

Of the twenty participants in this study, thirteen are either Nationally Board Certified Teachers or currently in the process of gaining certification. Of the six remaining participants, three attempted the National Board Certification process (one attempted once, two attempted the process twice) but failed to reach the required scores to receive the recognition. North Carolina boasts the largest number of Nationally Board Certified teachers in the nation. Certainly, one would believe this process has an impact on teacher identity—and it does—but not due to the process itself.

National Board Certification is a vigorous process which requires a candidate to review and reflect on their teaching practices to prove they are among the most qualified teachers in the profession. This recognition comes with an extra incentive: all Nationally Board Certified Teachers receive a 12% increase in income—regardless of the pay scale of the state in which they work. For participants in this study, a guaranteed pay increase was the only determining factor in whether they would pursue National Board Certification. One hundred percent of those teachers who currently hold, are pursing, or have pursued the certification agreed that the only reason they were willing to take the time to complete the strenuous process was due to financial incentive.

Valarie is a twenty-one-year veteran science teacher in a very small, rural school. She has been Nationally Board Certified for over a decade and holds a very high opinion of how the process changed her outlook on teaching as a profession and her role in the classroom. However, she did not initially pursue National Boards believing it would change her as a teacher. She describes the immense impact her decision has made in her life with the following reflection.
Why did I do my boards? Definitely the 12% pay increase. I do not have a master’s degree. My parents paid for a bachelor’s degree and that was it. I never felt I had the money to invest in a master’s program or the time. So, at the time I did my boards, my children were very young. It was a very difficult experience and I am not sure how I got through it, but it was worthwhile. I wanted the extra credentials. And I wanted the pay raise. But the process made me more aware of my classroom practices. Like, I am more reflective about what works and why. The whole process gave me a boost of confidence, and once new teachers are eligible, I would completely encourage them to do it. It is a great option for new teachers to help them gain confidence. (Valarie, Interview #2)

Brad, who is currently pursuing his certification, can already see how National Board Certification is impacting his teacher identity; despite his initial reasons for pursuit being monetary compensation. In the following quote from our second interview, Brad details how money isn’t the only thing of value which he is receiving through this process.

I am currently attempting the boards. And I guess, if I am honest, it is the money. I feel like if I keep doing what I enjoy doing, I need to maximize my salary. I picked one of the worst states to be a teacher in as far as money is concerned. But as I am starting to do it, I realized this could actually help to make me a better teacher. It would actually force me to reflect on things I wouldn’t normally. It challenges me to review how I look at lessons, classes. You know, the whole picture. I’m glad I am doing it, but I wouldn’t do it if I didn’t get paid for it. It’s a huge investment of time. (Brad, Interview #2)
Participation in optional professional development such as National Board Certification requires teachers to devote time and energy (and in the case of National Board Certification, money) to a cause which is designed to better themselves as teachers. For the majority of the study participants, the desired outcome of higher income was a given, but the change in teacher identity through recognition and building of confidence was an unexpected, positive outcome. National Board Certification supports the teachers A-Identity, as completion of the program provides them with a sense of ranking among the best and brightest within their field. For Adam, National Board Certification positioned him with the top teachers in the country. He explains in the following how that recognition is greatly needing for his personal and professional identities.

*If I am honest, I first pursued the boards for the money. But getting my boards was just a step for me in my overall goals. I had personal goals that I was going to prove myself as the best. That’s where my graduate pursuits lead me. That’s why I did the boards. I have had a few colleagues who pursued things and you want to emulate those people around you. I saw them doing these things and said, “I don’t want to just be a bachelor degree teacher.” (Adam, Interview #2)*

The National Board Certification program is not the only voluntary development program in the state of North Carolina, although it is one of the most popular. Analysis of the data shows that while National Board participants may not directly see the program as beneficial to their teacher identity, the processes of lesson planning with a purpose and reflection on practice have deep impacts on their views of the profession, their abilities, and the benefits of being part of the teaching profession. For those who have pursued or are currently pursuing recognition in this community of high performing teachers, their pursuit
provides a sense of belonging necessary for the development of the individual’s affinity identity.

**Recognition & Gee: Perception is Reality**

The desire for recognition, particularly for ability or accomplishment, is not uncommon. Of all the participants in this study only one mentioned that recognition was not important to them. For some, choosing to pursue outlets for recognition is a path through which they can improve their institutional identities and expand upon their own self-perception and teacher identity. National Board Certification is not an easy process, and those teacher who have taken on the challenge understand the rigor involved and emotional investment which goes in to such a process. Aside from the monetary compensation for successful completion of the program, these teachers find themselves belonging to an affinity group which is highly regarded by figures of authority. Thus, increasing not only their Affinity Identity, but also providing them with a new facet of their Institutional Identity which has been recognized on a larger scale. For those teachers in this study who pursued but did not receive their certification, a sense of accomplishment was still noted in their description of the process. These teachers expressed that while they did not receive the certification, they were still encouraged and supported by their administration—who offset the negative institutional identity factors which could result from a non-supportive environment.

**Mentorship, Teacher Identity, and Retention**

The final assertion within the theme of relationships and professional development includes discussion of the role of mentors in teacher identity development. Participant data showed mentorship to be a recurring theme when discussing teacher professional identity,
both in the positions of being a mentor or having a mentor. Mentorship opportunities can be impactful for teachers of all backgrounds and experience levels, particularly when developing their teacher professional identities.

Mentorship is most common in schools with beginning teachers; however, as the participants reflected when discussing their professional development needs, mentorship opportunities occur in both formal and informal settings. Mentoring can occur by and for teachers of all experience levels and is most effective when there is a sense of mutual interest in the success of the teacher(s). These relationships, as described by Virginia in her first interview, can be as beneficial for the mentor as they are the mentee.

*I am the “mom” of our department, and they will tell you that. You know, we have a lot of young teachers in our school and I am always there to help them. To remind them that this is a job and not their life. I try to teach them things I know that made me who I am. But these young people come in with some really great ideas. I have content knowledge, but they have knowledge on so many great things.* (Virginia, Interview #1)

Danielle discussed the benefits of mentoring as it relates to teacher identity, self-awareness, and the desire to teach. As a new mentor, she has begun to evaluate how her role as a mentor may impact another teacher. Though she didn’t consider these things as being important while she was undergoing the beginning teacher program, having a strong relationship between mentor and mentee provides opportunity for self-evaluation and identity development through dialogue and interaction. This can influence the D-Identity development for both the mentor and mentee as they develop their relationship, which is supported by Danielle’s comments below.
I had a great mentor when I was going through the program, and I didn’t think much of how lucky I was that he was so wonderful. ... But now I think being a mentor makes me think twice. I am a complainer by nature, so I think that what I try to do—because she is my partner as well as my mentee—is not give her problems that aren’t hers to handle. So, I can’t go to her to vent and that’s okay. It makes me think about the things I am doing and saying and how they might influence someone else. I try to let her have more of our time because I am sure her frustrations are greater than mine. (Danielle, Interview #2)

A strong mentor relationship also helped Sandra, who came to teaching as a second career, to gain confidence in herself and her ability to reach challenging students. She reflects on those early experiences as follows.

I liked my mentor at my school, she was like a 30-year teacher so, um, she was well seasoned and a good resource for me. Classroom management was a big thing for me when I was new. They brought me in in October because they had a teacher who wasn’t working out. The kids had a sub for a month and they were used to just doing whatever they wanted to. They were really mad when I started making them do work, so I did have classroom management issues that first year and it was good to have someone on campus who I could commiserate with and who could tell me, “Try this” or “This is what you can do.” You feel a little less thrown to the wolves. She is not my mentor anymore, but I try to talk to her whenever I can. (Sandra, Interview #2)

Formal mentor relationships, however, do not always feel genuine, and therefore do not fully attribute to the D-Identity development for those teachers involved. The North Carolina Beginning Teacher Support Program is evaluation-based, meaning mentors are
required to evaluate their mentees and assist in determining their readiness for full licensure. This places stress on the mentee to perform as though they are at their best, even if they are facing challenges. For mentors, the stress of evaluating a colleague can also hinder development of interpersonal relationships and true discourse. Participants in this study agreed, as explained in the following quote by Courtney, that their mentor relationships would be more beneficial if they were able to have a relationship with others that wasn’t ultimately based on teacher evaluation or performance.

*The program was good in the fact that you have someone to talk to. Like, the actual mentor program is just you answering questions about what you do in the classroom and doing classroom observations…it’s not effective. It was mostly just paperwork where we put stuff down to get it out of the way. But being able to talk to someone who will listen to your questions and not judge you. I think that was what was most helpful.* (Courtney, Interview #2)

Mitchell, who has been formally mentoring teachers for ten years, agrees that while the NCBTSP has good intentions in developing relationships for new teachers, it fails to provide them with opportunities to develop true dialogue among both beginning and experienced teachers. He explains the impact this has on the mentor-mentee relationship in the following statement.

*I think the BT programs are really good now, compared to when I started. I did not have that support when I first started teaching; I just had a department to give me support. That’s the big thing. These BT’s [beginning teachers] need help. They need support. They need someone to listen to you, to let you vent. ... That’s why I think so many people find their real mentors in people different from their assigned mentors.*
They don’t want to think they’re being judged for every little thing they do. (Mitchell, Interview #2)

Mentorship & Gee: Building the Identities of Others

Mentorship provides opportunity for teachers of all experience levels to develop and enhance their Discursive Identities as well as to reinforce pedagogical practice. The dialogue required to foster an effective mentor-mentee relationship allows for individuals to gain understanding of who they are and how others view them. On the contrary, when mentor support is limited or mentees do not feel as though a mentor has their best interests at hand, the mentee runs a risk of adopting a negative self-perception, a negative view of their mentor, and potentially a negative view of their role in the school. Positive mentor relationships can not only impact the identities of the beginning teacher/mentee, but can also foster and support the already established identities of mentors by incorporating them into new affinity groups and enhancing their opportunities to interact with and help others.

School Turnover, Relationships, and the Future of Education

In reviewing the data from the research questions, relationship development is critical to a teacher’s identity, and in many situations, associates with their desire to remain in or leave the profession. There were notable differences in relationship elements of teachers from schools with high teacher turnover in comparison to those with low teacher turnover. For instance, teachers in schools with high turnover also struggled more commonly with other important issues, such as low performance evaluations or undesirable working conditions. For these teachers, relationships did not just seem important; they felt critical to the day-to-day interactions.
Many of the teachers in high turnover schools presented as protective, almost
defensive, over their students when discussing relationships. This stemmed from their need to
care for children who were oftentimes of underrepresented backgrounds, such as low
socioeconomic status or ethnic minority backgrounds. Low turnover schools also presented
unique relationships with students, as the teachers felt secure and comfortable relating to
their classes but did not present the same urgency of care as those teachers from high
turnover backgrounds.

Relationships with colleagues did not differ much in comparison of the two groups,
with one exception—administrators. Teachers in schools with high principal turnover
discussed feeling more uncertain of their teaching ability and viewed their relationships with
their colleagues as being more important than those with their administration. Brad, who
previously taught in low-performing school with very high principal turnover, noted the
“revolving door” of administration made it impossible to understand what was expected from
teachers or students, which impacted his decision to remain in that district.

Teachers in high turnover schools are presented with unique challenges, as they are
often the schools in which students and faculty struggle to meet state-mandated goals. In this
study, rarely were high turnover schools also those schools with high performance. Though
the role of relationships has played a pivotal part in determining teacher satisfaction in this
study, it cannot negate the fact that many participants are still considering leaving the
classroom. These participants indicated their identity as a teacher was no longer enough to
keep them in the classroom. This is particularly concerning, as some of these teachers have
fifteen years or more of experience, and could often discuss the occurrences which made
them reconsider their career choice. These teachers provided data which informed the study
when discussing mandated trainings, assessment requirements, and relationships with administrators. In addition, however, the dissatisfied teacher participants also provided insight into the various other factors which may encourage a teacher to remain in the profession, such as monetary compensation or fear of being unable to care for their families if they left their job. These other factors, often external, should be part of the discussion of teacher identity, and researched in more depth as we look toward the future of education.

Teacher turnover will to continue play a critical role in the performance of students, teachers, and schools as a community until we understand how to support teacher identity development.

**Summary**

In this chapter, I have analyzed and reviewed the data collected from interviews with twenty North Carolina teachers regarding the development of their teacher identity and their desire to remain in the classroom. From their data, the theme of relationships recurred through many facets of the teachers’ experiences. For all teachers involved in the study, relationships played a pivotal role in the development of their teacher identity, particularly related to affinity and institutional identities.

Affinity identity develops for an individual when they become part of a formal or informal group and carry out tasks which result in a greater goal. This identity aspect is fostered when teachers develop relationships with students, colleagues, and those individuals with whom they desire association, such as prestigious group affiliations within the school.

Institutional identity develops through internalization of interactions with authority figures. In terms of teacher identity development, interaction with or perceived opinion by
administrators, policymakers, parents, and the community can greatly impact how a teacher feels about their place in education.

Identity development, particularly in terms of affinity and institutional identities, can greatly shape how a teacher views their abilities and can influence decisions to remain in the profession. However, discursive identity (through interaction with individuals) and natural identity factors (such as race) also play a pivotal role in the development of teacher identity. In some instances, these interactions can influence a teacher’s decision to remain in their profession.

Data analysis for this study concludes that all teachers, regardless of years’ experience, depend on relationships to foster their sense of belonging and increase their overall satisfaction in their careers.
CHAPTER V: DISCUSSION AND IMPLICATIONS

The purpose of this research study was to review and analyze science teacher retention as it relates to teacher identity. This study was created with the assumption that science teachers who are aware of their professional identities are more likely to remain in the classroom. This assumption is based on literature surrounding teacher identity, positional identity, and Gee’s (2000) framework of identity development. Based on this assumption, research was conducted through semi-structured, one-on-one interviews with mid- and late-career science teachers in North Carolina public schools.

This chapter provides a summary of the findings and discusses the conclusions drawn from data analysis. Additionally, this chapter suggests implications this research study could have on teacher retention in STEM fields. Finally, I conclude by suggesting future studies which could be of value for teacher identity and retention research.

Teacher Identity Characteristics and Relationships

Three themes, each with a focus on relationships, developed through data analysis of the first research question: “What are the characteristics of teacher identity of mid and late career teachers which might influence a decision to remain in the profession?” Teacher identity characteristics such as confidence in teaching ability, feelings of support, and sense of belonging were all discussed as being greatly impacted by the school environment and types of relationships developed among staff, administration, and students. Regardless of the participant’s demographic background or number of years in the profession, all interviewees discussed the importance of developing relationships when describing how their identity has been shaped and their reasons for remaining in the teaching profession.
Mid-career teachers, who placed a greater emphasis on developing connections with colleagues, more closely relate their teacher identity to affinity grouping, whereas late career teachers’ institutional identity was more valuable as they increased leadership roles and interactions with figures of authority. As principal attitudes and leadership skills play a role in determining if a teacher chooses to remain in the profession (Thibodeaux et al., 2015), it is incredibly important to foster these positive interactions for mid and early career teachers as well. Both mid- and late-career teachers overwhelmingly agree, however, that these relationships pale in comparison to value they place on student-teacher relationships.

Teaching is a social profession in which relationship development is critical to success of students and teachers alike (Sinha & Hanuscin, 2017). Unlike other professions, teaching requires constant interaction with stakeholders at all levels.

One such critical area of interaction occurs among colleagues within a specific grade level, school, district, or other professional affinity group. A primary concern for many mid-career teachers, relationships among colleagues are likely to develop a teachers’ “responsibility for learning” (Qian, Youngs, and Frank, 2013). This responsibility for learning encourages a school-wide concept of responsibility, where teachers from all grade levels and content areas are responsible for the success of all students. In other words, a veteran science teacher would be view themselves as an accountable party for the success of a students in an English or mathematics classroom. This mindset provides teachers with a sense of trust in another, and strengthens their Professional Learning Network (PLN) across grade levels and content areas (Trust, Krutka & Carpenter, 2016). Affinity identity is impacted when teachers feel they are members of a group in which everyone has the best interest of students, colleagues, and the school community in their actions and interactions.
with others. This community-minded approach develops trust within the school and can foster a sense of teacher support for mid-career teachers who markedly noted needing greater interaction with their fellow teachers (Hallman, Smith, Hite, Hite & Wilcox, 2015). Mid-career teachers often do not have the mentor support offered to beginning teachers, yet they are not prepared to undertake the responsibility of mentoring others. These teachers must, therefore, depend on an affinity group that may or may not provide them with the instructional and pedagogical support they desire or may even face isolation within the workplace. Lack of support and isolation often lead to stress and lack of trust (Troman, 2008).

Relationships are not only important in North Carolina schools. Studies from around the world have validated the idea that colleagues can help to determine a teachers’ likelihood of remaining in the profession. Viernes and Guzman (2005) conducted a study with Filipino teachers wherein they described colleague-to-colleague relationships as being deeply rooted in care and concern for one another, much like a family. This supports how many of the participants reflected on their own colleagues, as individuals who became an extension of their own families. This familial relationship positively adds to feelings of school-level responsibility and commitment to the profession (Viernes & Guzman). These relationships must extend beyond typical mentoring or professional interactions which are common in other professions, evolving into deeper levels of respect, trust, and assurance.

Additionally, the entirety of a school’s culture hinges on the levels of trust teachers place upon their administrators (Buchanan, 2015). Poorly-run schools, or those where teachers feel the principal mistreats teachers, are less likely to retain quality teachers (Bryce, Wilmes & Bellino, 2016). This is particularly true of low-performing schools, or those in
which students are non-white or from low-income backgrounds (Boyd et al., 2011). According to the data from this study, principals play a pivotal role in determining overall teacher happiness. Recall the case of Susan, who after working under a highly respected administrator for nearly a decade, suddenly found herself seeking new employment due to the negative and personally-offensive interactions she experienced with her new principal. Perceived mistreatment by a principal can cause a teacher to feel inadequate and suffer from psychological and physiological issues stemming from their stressful work environment (Blasé, Blasé & Du, 2008). Negative interactions with principals can also cause teachers to consider leaving the classroom altogether (Hughes, Matt, & O’Reilly, 2015; Conley & You, 2017). On the other hand, teachers who feel empowered by their administrators are more likely to reflect positively on their school environment as well as their career decisions (Moye, Henkin, & Egley, 2005; Van Mæle & Van Houtte, 2015). In the case of teachers such as Susan, the incredibly negative environment not only impacts her desire to remain in the teaching profession, but also adversely impacts her institutional identity. Although she is able to carry out her role as a teacher, the perceived distrust from her administration leads Susan to question her effectiveness or usefulness in the classroom. While colleague-colleague relationships and teacher-student relationships have been found to be helpful in retaining teachers, principal-teacher relationships have a greater impact on teacher retention (Thibodeaux et al., 2015). Trust and support from administration can be the single most important factor in reducing some of the many causes of teacher burnout (Van Mæle & Van Houtte, 2015).

During data analysis for this study, interaction with students was identified the single identity-development factor by all participants. Research has shown that student-teacher
relationships are valuable in reaching students and encouraging learning (Gehlbach, Brinkworth, King, Hsu, McIntyre & Rogers, 2016). However, teachers’ physical and emotional well-being is also determined by student-teacher interactions (Split, Koomen, & Thijs, 2011). Teaching requires emotional investment in the lives and well-being of students; how that investment forges into a relationship can have lasting emotional impacts (Uitto, Lutovac, & Kaasila, 2018). For example, in the case of Adam, understanding his teacher-student relationships was most salient; he has developed many positive relationships that foster his belief that he is an effective practitioner. Teachers who have developed trusting relationships are at a lower risk for experiencing burnout in their career, and, according to the data, are more likely to reflect positively on their own teacher identity (Ju, Lan Li, Feng & You, 2015).

**Student Achievement and Teacher Identity**

Understanding the significance of teacher-student relationships in teacher identity development, it is important to consider those things which might interfere with said relationships. High-stakes testing occurs in science at every grade level, whether mandated through North Carolina End of Grade/Course testing (grades 5 and 8, as well as high school biology), or through North Carolina Formative Assessments (grades 6-7, and all other high school content). Student achievement scores are reported by the state and can reflect positively or negatively on an individual teacher’s effectiveness ranking. These scores also inform an overall school report card grade made visible to the public.

For teachers and students in schools under pressure to improve their low ranking or to maintain their already high scores, testing pressure can be great; and many teachers feel they are not equipped (Brown, 2015). The pressure of testing, according to the participants in this
study, can cause rivalry, feelings of helplessness, and impede on relationship development with students and staff. Measurement of teacher success is difficult to gauge, as evaluation tools are highly subjective. Teacher evaluations are helpful in demonstrating for teachers changes they need to make in the future (Taylor & Tyler, 2012), but do not negate the effects from poor teaching which has already taken place. Therefore, it is sensible that districts would use student performance as a tool for understanding the overall impact a teacher is having in their classrooms. This puts pressure on students and teachers to “perform” on state tests and can even influence teacher identity and retention.

In North Carolina, test scores are not only measured through proficiency, but also in a growth model which shows how individual students performed in relation to their previous testing experiences. This growth model is thought to provide a fairer approach to student evaluation, as not all students will perform at or above grade level. For teachers of gifted students, growth expectations can be incredibly challenging to meet. Students who are performing at nearly perfect proficiency in previous years will not have the scale-score opportunity to show major growth on end-of-grade evaluations. While these students still show proficiency, their lack of growth places the teacher in a lower performing category than other teachers whose students have experienced great opportunity for growth. This categorization places teachers in an undesirable affinity group to which they do not want to belong and could even lead teacher attrition for those who feel they are ineffective.

High-stakes testing also influences the curriculum which teachers are allowed to teach and often dictates how the curriculum is delivered. Participants described feeling as though teacher autonomy was being disregarded and that their ability to teach without testing in mind was obsolete. This lack of autonomy decreases pleasure in teachers’ work (Rooney,
2015) and establishes an environment which only focuses on tangible measures of learning as opposed to the development of the whole child. Children should be taught in ways that enhance their cultural background and understanding of others (Zoch, 2017), but the participants in this study reported that they are often teaching strictly to the test. Many of the study participants discussed the intrinsic value of teaching which is derived from watching children become well-rounded members of their school and community, and place less emphasis on test scores to determining their success as a teacher.

While the future of student evaluation via end-of-year/semester summative assessment is unknown, the process does not appear to be losing steam. Therefore, teachers are compelled to utilize additional measures of student achievement to reinforce their reasons for entering the profession and encourage students for whom these assessments may be challenging. For instance, Nicole worked at an alternative school where only 12.5% of students passed their science summative assessments during the 2017-2018 school year. She had to develop alternative measures of student success which she uses to indicate whether she feels her students are learning; however, her efforts do not change the institutional identity placed upon her by the state when she is listed as a less effective science teacher than other teachers in her district.

**Supporting Teacher Identity in Mid-Career Teachers through Professional Development**

This study was developed with the assumption that teacher identity (and ultimately, retention) can be influenced by the types of professional development experiences a teacher undergoes. The second research question which informed this study is “How do systemic programs, such as the North Carolina Beginning Teacher Support Program and the National
Board Teacher Certification, affect NC public science educator’s identity, as well as their desire to remain in the classroom?” While professional development did not prove to be a critical factor for veteran teachers, several themes for mid-career teachers emerged.

Among participants in this study, teacher identity characteristics were more fluid in mid-career educators than in those with fifteen or more years of experience. Teachers in the middle of their career are at a particular crossroads in their professional lives; they have the understanding necessary to no longer be a novice teacher, yet they lack pedagogical and content experience possessed by veteran teachers. Therefore, mid-career teacher identity could be less contingent on their content knowledge or classroom management, but more on their sense of belonging within the school culture (Kelchtermans, 2017).

Mid-career teachers can face many insecurities in understanding their teacher identity, particularly for those teachers in the various science fields. Secondary science educators often have sufficient college credits to pursue careers in fields outside of education. Opportunities outside the classroom, coupled with an underdeveloped teacher identity, could lead to higher rates of turnover in mid-career science teachers. However, mid-career teachers may also benefit from their flexible concept of teacher identity, as they are more likely than veteran teachers to adapt to changing school environments (Reio, 2005). Adaptability of mid-career teachers, coupled with their desire for collaborative work environments (Strahan, 2016), could be the identity factor which helps to best keep science teachers in the classroom.

Encouraging mid-career science teachers to remain in the teaching profession will not be an easy task. Teachers feel as though they are under high pressure to perform with little reward. Additionally, the need to build relationships is not always met through the school environment (Kelchtermans, 2017). The teacher identity of mid-career science teachers could
be greatly enhanced by providing all teachers the opportunity to routinely engage with other professionals in their school, district, and region. District-wide professional development as well as building-level support would serve as tools through which experienced teachers could engage in much needed discourse concerning those issues which cause the most stress: content, classroom management, and interaction with parents (Thibodeaux et al., 2015). Participation in these supportive affinity groups would allow science teachers to grow in their teacher identity and alleviate some of the many concerns which drive teachers out of the profession.

**Communities of Practice**

According to study participants, current professional development practices are not viewed as beneficial in developing teacher identity or improving professional practice. The majority of professional development is conducted in a seminar or “sit and get” manner through which teachers are presented with information and encourages little interaction with other teaching professionals. This model for professional development does not account for the individual needs of teachers in their unique content areas, school, or district. Professional development opportunities that engage participants in a Professional Learning Network (PLN) are preferred by classroom teachers, particularly by those who lack resources for discussion and greatly influence relationships among teachers of various backgrounds (Trust et al., 2016). Online PLNs have become increasingly popular, with many teachers turning to social media and other online platforms to find the support they desire without the harsh criticism that sometimes comes from more traditional professional development scenarios (Kelly & Antonio, 2016).
Participation in this type of PLN reflects membership in a community of practice. Communities of practice as defined by Wegner (1998) are formed when individuals participate cooperatively to meet a common objective. The community of practice developed in teacher PLNs supports teachers’ need for communication, understanding, and interaction with other community members who share a similar educational goal. Wenger describes identity as being “a pivot between the social and individual” (p. 145) where the individual identity as well as group identity are enhanced as members actively participate. In this practice, teachers are not only sharing their own expertise with others but are also placed in a position where learning is always taking place. This evolution of self through membership in a community of practice is described as situated learning (Lave & Wenger, 1991). Teachers of all experience levels benefit from situated learning within these communities through legitimate peripheral participation. This means all participating members—from novice teachers to the most experienced veterans—will participate and learn from one another. First, this will occur through fringe participation by those who are newcomers to the group, eventually evolving into full participation (Lave & Wenger, 1991).

Teachers for whom professional development experiences have been primarily centered around presentations as opposed to community-based opportunities for identity development are greatly reduced in this model. For mid-career teachers, situated learning in communities of practice can be particularly powerful in providing an outlet for demonstrating their own expertise while still fostering their identity development and pedagogical aptitude through interaction with mentor teachers. Additionally, leadership roles can develop as they take on challenges faced by novice teachers. Both aspects of the novice-expert (or apprentice-expert) relationship are enhanced for mid-career teachers in community-based
professional development practices, particularly through the use of informal conversations (Thomson, 2015).

Additionally, the concept of situated learning in communities of practice revolves around the idea that teachers are learners. Treating teachers as professionals who progress in their development throughout their careers provides more support than does the utilization of a deficiency-based model that address only those areas in which teachers appear to struggle (Cohen, 2008). If a school community, for example, is struggling to provide adequate science instruction to students, the deficiency model would address this concern but would not incorporate the positive aspects of individual classroom practice which might be beneficial to other teachers. This is not to say that specific issues for individuals should not be addressed. Of course, if a teacher is struggling with a specific aspect of their instruction, it would not benefit the students or teacher if that issue was allowed to go unresolved. However, for general professional development practice, allowing teachers to interact and learn within a community in which they feel supported will enhance individual practice and inform deficiency through examples of effective strategies.

For science teachers, specifically, this could be of great benefit in determining best practices for inquiry-based classrooms (Bryce, Wilmes, & Bellino, 2016) which require teachers to constantly transform their instructional and pedagogical practices. Victoria Deneroff (2016) argues that this concept of socially-constructed identities is more valuable for science instruction than simply viewing identity as a concept of knowledge and belief. This supports Gee’s theories of socially-constructed identity in the form of belonging to an affinity group of science teachers within a particular community. Interaction among community members can provide new inquiry ideas and enhance teacher understanding of
content, pedagogy, or other classroom practices with which they struggle. This idea, referred to as Pedagogical Recycling (O’Donnell-Allen, 2005), refers to the multitude of changes a teacher may choose to make within the different social contexts through which they are able to engage with one another. In turn, these teachers can utilize discourse with other professionals to engage in reflective practice and emphasize their identity as a learner within the community (Desimone, 2009).

In today’s technological society, PLNs and communities of practice do not have to occur in face-to-face contexts. Teachers from around a specific region, state, or nation can work together using various online platforms which encourage conversation and allow for diverse insight. Mackey and Evans (2011) describe online networks as opportunities for participants to access desired learning pathways in their experiences as teacher and learner. Online communities of practice tear down walls of geographical restriction and negate insular views of community as being part of a physical boundary. Additionally, for those teachers who struggle with a particular deficiency they want to address without embarrassment or fear of judgment from their peers, online communities of practice provide a sense of support while maintaining particular aspects of teacher autonomy. Online communities of practice influence teacher emotions and can regenerate feelings of inspiration for teachers struggling to address their needs (Trust, Krutka & Carpenter, 2016). These online communities not only enhance teacher community, but also have the capability of instilling in teachers their identity as lifelong learners as opposed to deficient employees (Carpenter & Linton, 2016).
National Board Certification: Recognition and Identity

Not all professional development opportunities for teachers are mandated by district or school policy. Some teachers, like many in this study, seek out professional development to improve their practice, enhance community, or increase their income (Lustick & Sykes, 2006). National Board Certification (NBC) is a common route through which teachers can meet each of those three goals while also developing their teacher identity. For those participants in this study who have completed the NBC process, the process itself was not effective in changing their identity. In fact, the process was only viewed as a financial incentive, as one hundred percent of NBC teachers in this study reported their reason for pursuing the certification was the 12% increase in monthly income. This does not mean the outcome of the process was ineffective; it merely shows that teachers did not view the process as initially beneficial. It was not until teachers completed the NBC process that they were able to communicate the non-monetary benefits they received as Nationally Board Certified teachers. Such benefits include the ability for teachers to be more reflective on their practice and intentional in their actions in the classroom (Park & Oliver, 2008). Once participants were able to reflect on their newly-refined practice, the majority of participants described belonging to a new class of teachers—the “best of the best.” Inclusion in this elite affinity group creates a perception of competence and teaching ability which goes beyond traditional classroom practices (Price & Weartherby, 2017). Whether this perception is reality depends on how the teacher internalizes their new position as a nationally-recognized teacher and how that is enacted in classroom practice.

When a colleague becomes a NBCT, others in the school can benefit from their success. Teachers who have undergone the NBC process have been exposed to rationale
behind participation in the greater school community. For this reason, NBC teachers are more likely to become involved in school-wide initiatives and, given the opportunity, are more likely to assist other teachers with instructional or content issues (Frank, Sykes, Anagnostopolous, Cannata, Chard, Krause, & McCrory, 2008). NBCTs are also likely to become involved with NBC candidates, acting as a resource for those pursuing the certification (Park, Oliver, Johnson, Graham, & Oppong, 2007). This interaction with colleagues, through both the general teacher population and those pursuing the certification, improves colleague relationships and allows for learning to occur for both the NBCT and those with whom they interact.

An added outcome of receiving NBC comes from the recognition the certification brings. According to study participants, recognition in this community increases a teacher’s sense of purpose in the classroom, increases their self-esteem, and is a source of pride in their accomplishments as a teacher. Understandably, this equates to a more developed teacher identity which is rooted in recognition. Often this recognition results in involvement with professional learning communities outside of the school, including at regional or state levels. This presents an unfortunate reality of the career trajectory for many NBCTs—although they are more likely to have exceptional classroom practice, many NBCTs in North Carolina do not remain in the classroom for the duration of their career (Goldhaber & Hansen, 2009). Those who do choose to remain in the classroom find they have greater levels of mobility within school districts and are less likely to remain in low-income, underperforming, or minority-heavy schools. This provides a huge disadvantage for students who need quality teachers and also takes away from the number of exceptional colleagues available to fellow teachers at these high need locations (Goldhaber, 2009).
Limitations

Within the context of this study, there were areas of limitation which should be addressed. First, the study was based on volunteer participants who fit within the parameters of the study. Due to district constraints, as well as teacher populations in participating schools, teachers of color were highly under-represented in this study. Additionally, the study was conducted over the course of four months. In order to gain deeper insight into teacher identity, follow-up, longitudinal studies may be appropriate.

Finally, in the nature of interview studies, the data gathered has been self-reported. Self-reported data can present challenges when determining the reliability of the participant responses (Goneya, 2005), which is why careful consideration has been given to ensure proper coding and triangulation methods were performed. While self-reported data is not generalizable, that was not this study. The purpose, rather, was an aim to obtain in depth insights about perceived teacher identity, with future research in mind.

Implications for Future Research

This study sought to explore the connections between teacher identity and teacher retention for mid- and late-career science teachers. Most available research on teacher identity and retention focuses on beginning teachers, as they are the teaching subgroup which is most likely to leave the profession (Harmsen, Lorenz, Maulana & vanVeen, 2018). However, this study illustrates the fluidity—and perhaps fragility—of mid-career teacher identity. While teachers of any background can experience burnout in the profession, mid-career teachers risk growing stale in their profession (Farrell, 2014), as they are no longer new to the job, but have many years ahead before retirement is an option. Therefore, further research on mid-career science teacher identity and retention is recommended to increase
understanding of those factors which may play a role keeping quality teachers in the classroom. This research study’s focus was on teacher identity of science educators; however, the data collected can be applied to further research on teacher identity of mid- and late-career educators from all backgrounds.

One area informed by this study that needs further research is how professional development practices impact teacher identity for mid-career teachers. This study provides insight into the professional development needs of teachers, but should be enhanced to investigate longitudinal impacts of community-based professional development on the identities of teachers. For this future research, I propose a one school case study in which researchers would provide monthly professional development for science educators that involves strategic community involvement. Strategic involvement would include guided discussions, sharing of materials, and demonstration of best practices through scheduled observations. A study of this design should take place over the course of a school year, with quantitative and qualitative assessments throughout the process. Using “I” positions from the Dialogical Self Theory (Assen, Koops, Meijer, Otting, & Poell, 2018), it is my belief that using heavy dialogue in communities with other teachers would increase understanding and development of positive teacher identity.

Additionally, to inform teacher identity research for teachers of varying experience levels, I propose a multi-school, longitudinal study to implement recognition practices within the school. Teachers would participate in classroom observations and professional learning networks within their assigned school wherein they would provide weekly recognition to teachers whom they feel have exceeded expectations in the school. It is my belief that communicating recognition improves school morale and increases a teacher’s sense of
belonging in the school community. This primarily qualitative research study would then investigate how recognition impacted the teachers’ perception of themselves and their teaching abilities.

**Implications for Practice**

Existing research discusses the reasons why teachers leave the classroom but seldom focuses on the factors which may encourage teachers to remain in their profession. Much of the research on teacher attrition discusses professional demands which may be out of the control of building-level administration. However, the participants in this study felt their own identities were greatly impacted by their experiences within their schools, which requires administrators to examine the role they may play in creating an environment where employees want to work.

School-level reform is often easier to implement than district or state-wide policy, as the buy-in for change must come from within the school community. Just as schools adopt policies for supporting students, principals must be in charge of creating opportunities to support faculty. The data from this study shows that teachers need time with one another as well as interaction with colleagues and administrators in non-evaluative roles. For administrators, this means creating a safe space for teachers to talk about real classroom issues, ask questions about content and instruction, and observe other teachers in action. Creating a climate where teachers are empowered to discuss their practice lessens anxiety surrounding instruction, providing teachers of all content areas and experience levels with opportunities for growth.

Improving relationships among faculty and administration can also improve school-level professional development. Many of the science teachers in this study discussed the
importance of professional development which addressed their unique instructional and content needs, but they also discussed how the current professional development model does not allow for collaboration between science teachers. Administrators and district leaders can work to expand science teacher professional learning networks through multi-school professional development opportunities, integration of online learning platforms, and monetary support for teachers to attend regional, state, and national teaching conferences.

**Summary**

In this chapter, I have provided a discussion of the findings from this research study. Research has inadequately addressed retention of science educators in comparison to literature on teacher attrition. Teacher attrition studies provide great insight into reasons why teachers, primarily those in their first five years, leave the classroom. This study sought to understand reasons which might influence teachers to remain in the classroom. Under the assumption that identity characteristics aid in determining a teacher’s willingness to remain in the profession, this study was conducted to identify where these connections were most evident.

The level of professional demands placed upon science teachers is always increasing. State exams, teacher accountability models, increasing class sizes, and shrinking budgets provide many external factors which cause frustration for teachers of all content and grade levels. However, internal factors, such as teacher identity, can have a profound impact on a teacher’s overall satisfaction in the profession, informing their decision to remain in the classroom. Science teacher retention research, when conducted through a lens of teacher identity, can inform classroom as well as school-level practices. Unfortunately, many of the participants in this study seek greater opportunities for relationships within their school
environment which would enhance their experiences and foster identity development. These relationships were shown to impact teachers at each of the four identities theorized by Gee (2000) but were particularly powerful in informing affinity identity in participants. Allowing teachers’ time with other professionals improves their daily practice, relationships with others, and enriches classroom experiences.

In conclusion, teachers must feel as though they are an integral part of their learning community in order to remain in the profession. There are many factors which work against positive teacher identity for today’s science educators. It is the responsibility of researchers, teacher educators, and administrators to ensure teachers are supported as they discover who they are.
REFERENCES


Danielsson, A., & Warwick, P. (2014). ‘All we did was things like forces and motion…’: Multiple discourses in the development of primary science teachers. *International Journal of Science Education, 36*(1), 103-128.


Fearon, J. D. (1999). What is identity (as we now use the word). Unpublished manuscript, Stanford University, Stanford, Calif.


Zoch, M. (2017). “It’s important for them to know who they are”: Teachers’ efforts to sustain students’ cultural competence in an age of high-stakes testing. *Urban Education, 52*(5), 610-636.
APPENDIX A: EMAIL TO PARTICIPANTS

Dear Mr./Ms. ____________________________

Good morning/afternoon. My name is Whitney Richardson and I am a doctoral candidate at North Carolina State University conducting research on science educator retention through the lens of professional identity. I have obtained permission from your district and principal to conduct interviews with science teachers, and you were recommended as a candidate who fit the criteria.

If you are interested in participating, you would be asked to participate in two to three interviews, either face to face or via Google Hangouts. In the interviews, we would discuss your thoughts and experiences as a science teacher, and your views on factors which influenced your decision to enter (and most importantly, remain) in the profession. I will not be gathering data regarding your students or their performance in your class. No identifying information (your name, where you teach, etc.) will be reported, and your confidentiality will be protected at all times.

I greatly appreciate your consideration of this opportunity. Feel free to email me at wdreiner@ncsu.edu if you have any questions or concerns you would like to discuss prior to making a decision about participation.

Thank you,

Whitney D. Richardson, M.Ed.

North Carolina State University
APPENDIX B: INFORMED CONSENT

Consent for Participation in Research

I volunteer to participate in a research project conducted by Whitney Richardson under the guidance of Dr. Soonhye Park at North Carolina State University. I understand the purpose of the research project is to gather information about professional identity of science teachers and their retention in the profession.

If you have any questions or concerns regarding the study, please contact Whitney Richardson at wdreiner@ncsu.edu. If you have questions regarding your rights as a participant in the study, please contact Deb Paxton, NCSU IRB Administrator, at dapaxton@ncsu.edu.

1. I agree that my participation in this research project is voluntary. I understand that I will not be paid for my participation, and that I may withdraw from the study at any time.

2. I agree that I have the right to decline answering any questions which make me uncomfortable.

3. I agree to participate in interview sessions and observations with the PI. These sessions will be audio recorded, and notes will be taken throughout. For confidentiality purposes, these recordings will be kept in an encrypted file on a password protected computer. This computer is kept in a locked location where only the researcher will have access to the information.

4. I acknowledge that the researcher will not identify me by name in any reports, articles, or documents which result from our interviews/observations.

5. I understand that this research project has been approved by the Institutional Review Board (IRB). There are minimal risks associated with this research.

6. I have read and understand the explanation provided to me. Questions I have concerning the study have been satisfied, and I agree to move forward with participation in this study.

7. I have been given a copy of this consent form.

_______________________________________________  __________________
Signature                                      Date

_______________________________________________
Printed Name
# APPENDIX C: INTERVIEW QUESTIONS (FULL)

<table>
<thead>
<tr>
<th>Information Needed</th>
<th>Major Interview Questions</th>
</tr>
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</table>
| Research Question #1: What are the teacher identity characteristics of mid and late career teachers which may influence their decision to remain in the profession? | - How does the participant view their role as a teacher?  
- How does the participant view themselves as a person?  
- How does the participant feel the views of others compare to the views they have of themselves?  
- How has the teachers’ self-perception influenced their retention decisions?  
- Describe who you think you are.  
- How has your race/gender shaped your perception of yourself as a teacher?  
Have you noticed any discrepancies in how you view yourself and how others view you?  
Your school is in ______ community. Has the community had in shaping your perception of your role (or who you are) as a teacher?  
- How were you influenced or encouraged to enter the teaching profession?  
Describe how your relationship with students has impacted who you are as a teacher?  
How have your interactions with students (administrators, staff, colleagues, parents, friends, family, etc.) influenced who you are (or your roles) as a teacher  
How do your professional experiences influence your personal decisions?  
Did you feel as though teaching was a calling?  
Many teachers leave the profession, especially within the first five years. You have been teaching for ______ years. What has made you decide to stay?  
Was there an instance you can describe where you wanted to leave the profession? |
How are you a different teacher now than when you first started teaching?

Where do you see yourself (professionally) in five years? Teaching is...

What do you think should be done to encourage science teachers to remain in the profession?

<table>
<thead>
<tr>
<th>Research Question #2: How do professional development programs impact the identities of North Carolina science teachers and their decisions to remain in the classroom?</th>
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</thead>
<tbody>
<tr>
<td>• With what type of professional development experiences is the participant familiar?</td>
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<tr>
<td>• How has professional development shaped the teachers’ perception of themselves or their roles?</td>
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<td>• In what ways has professional development encouraged teachers to remain in the classroom?</td>
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<tr>
<td>• How can professional development better meet the needs of teachers?</td>
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<td>• What types of groups or organizations have you been involved with? How have they shaped who you are as a teacher?</td>
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<tr>
<td>How do you view your role within the school?</td>
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<td>How do you feel your roles within the school are determined?</td>
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<td>How do you feel your colleagues view your role within the school?</td>
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<td>Have you experienced any conflict between roles that you are expected to play within the school?</td>
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<tr>
<td>Has involvement with professional development programs (such as NC Beginning Teacher Mentor Program, National Board Certification, or other large scale professional development) shaped you as a teacher? How? Why or why not?</td>
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<tr>
<td>Why did you decide to become a NBCT? How has the process changed you as an educator?</td>
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<tr>
<td>Are there any specific programs or types of professional development which you think would have been of great benefit to you when you were a beginning teacher? Are</td>
</tr>
<tr>
<td>Card Sort Items</td>
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<tr>
<td>- What commonly cited reasons for teacher attrition/retention matter most to teachers?</td>
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<td>- CARD SORT: Sort the following criteria for remaining in the science classroom from most to least important.</td>
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## APPENDIX D: CODE BOOK

<table>
<thead>
<tr>
<th>Code</th>
<th>Key Terms</th>
<th>Description</th>
<th>Example</th>
</tr>
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<tbody>
<tr>
<td>Relationships: Students</td>
<td>Care, Trust, Respect, Children, Bond, Culture</td>
<td>The participant discusses their interactions with students and how it informs their daily practice, classroom culture, or reasons for teaching.</td>
<td>“When you tell them you care about them, and they know you care about them, they’ll do whatever you want. The majority of them. They’ll do anything I ask because I care. Relationships are one of the most important parts of being a teacher. More than how you teach it.” – Jon, Interview #1</td>
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<td>Relationships: Faculty, Staff, Admin</td>
<td>Love, Trust, Family, Support, Guidance, Support, Confidence</td>
<td>The participant discusses how relationships with colleagues, administrators, and other faculty/staff impact their sense of belonging, effectiveness, and role within the school community.</td>
<td>“My first team of teachers was absolutely amazing. I wasn’t expecting the support I got at the school where I worked. We were there for each other, to support each other. Like they’re my family.” – Danielle, Interview #1</td>
</tr>
<tr>
<td>Monetary Compensation &amp; Benefits</td>
<td>Pay Scale, Raise, National Boards, Benefits, Retirement</td>
<td>The participant (directly/indirectly) discusses teacher pay, district stipends, and methods through which to receive raises (such as continuing education and professional development).</td>
<td>“I wanted to serve my home district, but when you consider raising a family and all of that, income becomes a factor. It’s hard to turn down an extra $1,000 a month.”</td>
</tr>
<tr>
<td>Category</td>
<td>Key Terms</td>
<td>Participant Description</td>
<td>Quote</td>
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<tr>
<td>Recognition</td>
<td>Recognize, Acknowledge, Award, Proud</td>
<td>The participant describes self-recognition in affinity groups and recognition by administration, community, or family/friends.</td>
<td>“That’s substantial.” – Adam, Interview #1</td>
</tr>
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<td>Achievement (Student)</td>
<td>Assessment, Testing, Success, Scores, Growth, Learning</td>
<td>The participant discusses the role of formative and summative assessment in their self-concept and role in the school environment.</td>
<td>“Their achievement is my achievement. You teach for the impact, and if you don’t care about their success, you don’t need to be a teacher.” – Adam, Interview #2</td>
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<td>Professionalism</td>
<td>Respect, Professionals, Deprofessionalism, School Board, Devalued</td>
<td>The participant describes their perceived reception by community stakeholders, parents, policy makers, etc.</td>
<td>“But the thing is, we don’t feel appreciated. I feel taken advantage of. I don’t feel like these people see me or any other teacher as a real professional . . . . We’re factory level.” – Susan, Interview #2</td>
</tr>
</tbody>
</table>
Professional Development

Observations, Reflection, Communication, Support, Growth

The participant discusses their experiences and desires for professional development which would improve their instruction and pedagogy.

“We’ve been talking about doing this in our school this year and I really hope we do it. I just want to watch teachers do what they do. There are so many intangibles you can’t see in the day to day of teaching. Sometimes, like, when you’re trying something new or exciting it’s not something you can put into words for others, but something you can see.” - Brad, Interview #2